

FIFTY-FOURTH
ANNUAL REPORT
OF THE
FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1920

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

THOMAS MULVEY

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1921

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-fourth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, May, 1921.

CONTENTS

	PAGE
Deputy Minister's Report Covering—	
Investigations into Fish Curing Methods..	8
Utilization of Fish Offal..	8
Reorganized Service.....	8
Change of Policy in British Columbia..	9
Publicity, Transportation and Marketing..	9
Scouting for Mackerel..	11
Jurisdiction over the Fisheries..	12
International Questions..	13
Investigations into the Natural History of the Lobster..	17
Fishways..	19
Inspection of Fish.	20
Cannery Inspection..	22
Fisheries Statistics..	23
Fishing Bounty..	23
Fish Culture..	26
Oyster Culture..	28
Biological Stations of Canada..	29
Review of the Fisheries of 1920..	32
Atlantic Fisheries..	32
Inland Fisheries..	33
Pacific Fisheries..	34

APPENDICES

	PAGE
1. Reports of Chief Inspectors of Fisheries..	35
2. Entries in Canadian Ports by United States Fishing Vessels.	52
3. Report of Fisheries Engineer..	60
4. Fisheries Expenditure and Review..	64
5. Summary of Licenses issued..	65

DEPUTY MINISTER'S REPORT

To the Hon. C. C. BALLANTYNE,
Minister of Marine and Fisheries.

SIR,—After a separation of six years, the Fisheries Branch was again attached to this department, and I have now the honour to submit the fifty-fourth annual report thereof. By Order in Council of the 16th of June, 1914, the Fisheries Branch was transferred from the administration of this department to that of the Naval Service, such transfer to take effect on July 1, 1914. At that time the work of that department was comparatively light, but owing to conditions that were brought about by the war, it was considered that the duties thereof will in future require the full attention of the deputy minister; also experience showed that there is really nothing in common in the duties of the Department of the Naval Service and the Fisheries Branch. On the other hand, as the shipbuilding programme of this department would soon be completed, it was found feasible for the undersigned to assume, under your direction, the responsibility for the administration of the Fisheries Branch. Hence by Order in Council of May 29, 1920, the administration of that branch was retransferred to this department to date from July 1 last, or, as above stated, after a separation of exactly six years.

It is also of importance to note that by the terms of the Order in Council retransferring the branch the title of the chief administrative officer thereof was raised from that of "General Superintendent of Fisheries" to that of "Assistant Deputy Minister of Fisheries."

This report deals with:—

- Investigations into fish curing methods.
- Utilization of fish offal.
- Reorganized service.
- Change of policy in British Columbia.
- Publicity, transportation and marketing.
- Scouting for mackerel.
- Jurisdiction over the fisheries.
- International questions.
- Investigations into the natural history of the lobster.
- Fishways.
- Inspection of fish.
- Cannery inspection.
- Fisheries statistics.
- Fishing bounty.
- Fish culture.
- Oyster culture.
- Biological stations of Canada.
- Review of the fisheries of 1920.

Appendices to the report include the following:—

1. Reports of Chief Inspectors of Fisheries.
2. Entries in Canadian Ports by United States Fishing Vessels.
3. Report of Fisheries Engineer.
4. Fisheries Expenditure and Revenue.
5. Summary of Licenses issued.

12 GEORGE V, A. 1922

INVESTIGATIONS INTO FISH CURING METHODS

While the curing of fish by salting has been going on for centuries there has been a most surprising lack of exactness in the operations, and a want of knowledge as to the causes of certain results. For instance the "reddening" particularly of codfish is an old difficulty from which cause serious losses have been experienced; but all the causes and how they can be avoided are not known. Investigations have shown that bacterial action is an important cause and that certain salts especially such as are obtained from sea water contain impurities that may include such bacteria. Also exact data is needed as to the rates of penetration of different kinds of salt at different temperatures, the strength of brine required for fish of different sizes and at different temperatures, the length of time fish should remain in brine, etc.

There is also need for investigation into methods of smoking fish. Neither in this country nor in any other has there been the improvement in methods, keeping in view the importance and extent of this industry, that is observed in practically all other lines of industry. There is a remarkable absence of data as to the temperatures that should obtain. Also mechanical appliances to reduce the handling of fish during smoking, etc., to a minimum, and thus lower costs of production, have not yet been introduced to any marked extent. This is obviously a matter for the consideration of a mechanical engineer rather than of a chemical expert.

Some investigations into the smoking of fish were conducted by the Biological Board some years ago, but these were not followed to a conclusion.

UTILIZATION OF FISH OFFAL

The conversion of fish offal into commercial products—meal for feeding animals, fish scrap for fertilizer and oils of different grades—has long since passed beyond the experimental state. Where large quantities of offal can be obtained at given centres cheaply, a successful commercial business in converting it into such products is perfectly feasible, and is now being engaged in quite extensively in different places in Canada.

We have, however, an enormous quantity of offal being produced along our shores which is going to waste on account of no sufficiently economical method of using it being known.

Arrangements were made early in the year whereby these matters were taken up by the Biological Board in conjunction with the Research Council, which latter appropriated seven thousand dollars for fish curing investigations. Good progress has been made and two interesting reports are now about ready for publication.

REORGANIZED SERVICE

The reorganization of the outside service along the lines explained in last year's report has been well advanced. It has been completed in our Eastern Fisheries Division, which comprises the Maritime Provinces, and it is nearing completion in the Prairie Division. It had previously been effected in British Columbia.

The service has already been placed on a much more effective and efficient basis than the previous one. Underpaid part-time officers have been replaced by an intelligent group of young active men, who are devoting their whole time and thought to their duties. This is not only resulting in a determination on the part of each officer to have his district as nearly as possible above reproach from the standpoint of observance of the fishery laws, as these young men are already becoming enthusiastic about the possibilities of the fishing industry, as well as in the natural history of the various fishes. There seems every reason for confidence that in a few years these officers will not only be law enforcers, but they will be able to be generally helpful to those engaging

SESSIONAL PAPER No. 40

in the industry. To fit them to be such, a kind of summer school has been started. In September last all the officers in the Eastern Division were gathered at Truro, N.S., when they received a preliminary course of instructions. The Assistant Deputy Minister of Fisheries and the chief inspector for the division dealt with administrative topics. The Commissioner of Fisheries and Doctor A. G. Huntsman, of the Biological Board, gave a course of instructions in connection with fish life, and Mr. Robert Gray, Inspector of Fish Curing and Packing, dealt with the question of proper barrelmaking and packing pickled fish. These instructions occupied one week.

It is not intended to urge that a great deal of direct teaching could be done in that time; but the important point is that a start in what is a new movement has been made. The time was long enough to enable the officers to get the vision of what usefulness their positions can be made, if they do their full part in fitting themselves to properly carry through the possibilities involved.

It is intended to make this course of instructions an annual matter. To carry it out to the best advantage, it may be found desirable to call the officers together in units at suitable centres rather than as a whole. The greatest difficulty is to find a time when the officers can be spared from their districts for a considerable period and when those competent to give the needed instructions are able to arrange to do so.

CHANGE OF POLICY IN BRITISH COLUMBIA

The policy of protecting the salmon fisheries of British Columbia by means of limiting the number of persons that might engage in the fisheries and the number of canneries that might operate, together with usual regulations, which method of administration had been effective at least since 1908, was changed at the end of last year to an "open-door" policy. The department had felt for years past that the "open-door" policy was the proper one; but it was so strongly contended by those engaging in the canning industry that such a policy would speedily result in depletion of the fisheries that it was not previously found feasible to make the change. Obviously the difficulties of properly protecting fisheries such as the salmon fisheries, over the coastline of some seven thousand miles in extent, and most of which is more or less remote, are exceedingly great, and these are minimized if undue competition is prevented. The department, however, felt assured that even with the "open-door" policy the task of adequately protecting the different runs of salmon would not be an impossible one for it, and the experience of the past year has shown beyond dispute that it can do this. During the past season the Assistant Deputy Minister of Fisheries, accompanied by the Chief Inspector of Fisheries for the province went over the whole coast. He found the protection of the fisheries to be thoroughly in hand in every portion of the division, and that the organization was so complete that violations of the law could not go on to any important extent. It was also apparent on all hands that the change in policy was giving general satisfaction. The cannery managers without exception favoured it and the agitation amongst those desiring to engage in the industry, but who previously had been prevented from doing so, had disappeared.

The wisdom of the change is unquestionable and there seems little room for doubt that in the course of a year or two a request for reversion to the old policy would find no support amongst those engaging in the industry.

NEW DIVISION OF PUBLICITY, TRANSPORTATION AND MARKETING

The Publicity, Transportation and Marketing Division completed the first year of its organization on December 15 last. During the fifteen and a half months of its existence—up to the close of the fiscal year, March 31, 1921—this division has developed satisfactorily and in its various ramifications has proved of marked value to those commercially engaged in the fishing industry. The work of the three subdivisions is hereinafter discussed.

12 GEORGE V, A. 1922

Publicity.—The fact was early appreciated that our Canadian citizens and people of foreign countries required information as to the extent and importance of our fishing industry and enlightenment as to the comparative food value of fish and the economy of a diet with fish judiciously incorporated. At the production end of the industry propaganda is also required to impress upon fishermen, packers, etc., that certain standards must be maintained to satisfy consumers at home and abroad.

Since July, 1920, a Press Bulletin has been published monthly and distributed to newspapers throughout the country for the purpose of keeping Canadians advised regarding conditions, etc., in the industry. In addition, special illustrated articles have been supplied to different publications. Upon the occasion of National Fish Day the division exerted special energy to keep the newspapers posted and a series of special articles were sent out, together with appeals over your signature.

For some time there has been a want of literature in the form of pamphlets for the information of the layman and arrangements have been made for the publication of a series of these. Already two have been received from the printer—"Canada's Fishing Industry" and "Fish and Chip Shops"—and they are being distributed to advantage.

During the year competitions were in progress among school pupils throughout the Dominion and also among students in household economy. The prize winners in these competitions have not yet been announced.

Educational propaganda among the fishermen included a campaign to induce them to desist from using a fork in handling fish. A large display card pointing out by illustration and otherwise the evil results of such a practice was posted conspicuously at points where fishermen operate.

During the summer of 1920 photographers were engaged to take moving pictures and still photographs of various phases of the fishing industry in the maritime provinces. As a result of their work about 190 excellent still pictures and approximately 5,000 feet of film have been added to the department's collection. The moving pictures are already in circulation throughout the Dominion and later will be sent to foreign countries. Many of the still photographs are being put on lantern slides and will be circulated broadcast with appropriate lectures.

The retail trade has been urged to give more attention to advertising. Repeated efforts have been made to impress upon them the vital part which consistent advertising plays in the system of business.

Transportation.—Improved transportation is one of the vital necessities of the industry in Canada. During the past year many individual complaints have been received about inefficient freight and express service and discriminate rates. These complaints have come from the Pacific coast, the Atlantic coast and the district surrounding the Great Lakes. In the majority of cases satisfactory adjustments have been made and some cases are still pending.

In addition, efforts were made to improve the fast freight service from the Atlantic coast to Montreal and Toronto. The prevailing express rates and unsatisfactory service in many instances, have converted many to the idea that the satisfactory provisioning of these markets must depend upon regular fast freight service. As a result of a recent conference with Canadian National Railway and Grand Trunk officials, assurance has been received that the Canadian National Railway fast freight from Halifax and Mulgrave will adhere to schedule—that is, sixty-four hours and fifteen minutes from Halifax and approximately seventy-two hours from Mulgrave. Grand Trunk officials have furthermore given assurance that shipments for Toronto will be promptly picked up and made available for delivery in Toronto within thirty-six hours after leaving Montreal.

Marketing.—Concerning the marketing of fish in Canada there are many matters to be considered. The per capita consumption is not more than twenty pounds per

SESSIONAL PAPER No. 40

annum, which is exceedingly low considering Canada's position in the fish-producing world. It is doubtful if any fish-producing country of importance has a smaller per capita consumption. It is quite obvious, however, that people will not buy fish in large quantities at high prices. While the amounts paid the fishermen have declined in recent months to almost a pre-war level, there has not been a corresponding drop in the retail prices. The reason for this, apparently, is the increased cost of transportation, labour and general operations which have shown little or no inclination toward lower levels. It appears that there is room for improvement in the matter of retail prices, but the most effective way of bringing this about is to stimulate trade and to encourage consumers to vary their fish diet in order that a greater percentage of the fisherman's catch may be utilized.

Foreign trade.—During 1920 a comprehensive survey was made of the markets of the world in regard to fish requirements and the possibility of Canadian packers and exporters successfully meeting competition.

Canadian exporters have been advised from time to time by circular letter as to the possibility of extending trade. Recently such circulars have covered the Argentine Republic, Brazil, West Indies, Australia, India, and China. The fact that practical use has been made of the information thus furnished is proved by letters which have been received from exporters. There has also been furnished to interested parties the names of fish importers in foreign countries, as well as other information which will tend toward the development of foreign trade.

SCOUTING FOR MACKEREL

Arrangements were made last spring with the Department of the Naval Service to have the Fisheries Protection cruisers, detailed to follow the movements of the United States mackerel purse-seiners, endeavour to keep just in advance of the schools of mackerel and at least daily to send wireless reports to shore giving the locations of the schools of mackerel when observed, their apparent volume and the direction in which they were moving. There was a double object in this arrangement. First it was felt that a good purpose would be served by keeping the fishermen all along the coast who were interested in the mackerel fishery advised as fully as possible as to the movement and volume of the schools of fish, and in the second place information would be gained which would be of value to those studying the natural history of the mackerel.

The daily information sent by wireless from the cruisers was repeated by telegram to all points along the Atlantic coast to the fishermen who would be interested. The cost of these land telegrams was the only extra expense that was involved in the arrangement.

Cruising began off Cape Sable on the 8th of May, and the first school of mackerel was observed on the eleventh of that month forty miles east of Seal island. This school was apparently approaching from the south and was working its way north and northeast. It was then on the west edge of Brown's bank. On the 16th of May a large body of mackerel was observed thirty miles east of Cape Sable. This school apparently followed along the southern edge of Brown's bank, a portion of it moving up the deep water channel on the western edge of the bank while the remainder followed the deep water on the eastern edge of that bank.

On the 17th of May another large body of fish was observed moving slowly northward. It was coming from the south and was between Brown's bank and LeHave bank. It converged with the school previously mentioned. The fish were next sighted on the 20th of May west of Roseway bank, where the school divided, a portion going north of Roseway bank and the main body going east between Roseway and LeHave banks.

12 GEORGE V, A. 1922

The cruising was continued until the fish had passed the southeastern portion of Nova Scotia.

It is hoped that it will be found feasible to continue these observations in coming years so that the fullest information possible may be available as to the movements of the mackerel.

JURISDICTION OVER THE FISHERIES

The question of extending the jurisdiction of the Federal Government over the fisheries in all parts of Canada has finally been settled. This was done by the decision of the Judicial Committee of the Privy Council in the Fisheries Reference that was agreed to with the province of Quebec in 1915. As will later be shown this reference was considered by the Court of King's Bench in 1917, but owing to the conditions brought about by the war, it was not found possible to have it argued before the Judicial Committee until this year. The decision of the committee was given on November 30, 1920.

The decision finds in substance that there is a public right of fishery, over which the Federal authorities have exclusive jurisdiction, not only in the navigable tidal waters but in the non-tidal portions of the streams that are navigable as well, thus including valuable salmon and other fisheries.

The history of this question is concisely as follows:—

At the time of Confederation it was understood that by the provisions of the British North America Act, the complete jurisdiction of the fisheries in the different provinces was transferred to the Federal Government. A few years afterwards question arose as to whether this was the case. In 1882 a decision of the Supreme Court of Canada was obtained in the case known as "Queen vs. Robertson," which determined that the ownership of the fisheries in the non-tidal waters still remained vested in the provinces or in the riparian owners. This did not apply to what are now the Prairie Provinces and the territories north thereof, as the Crown Lands therein were owned by the Federal Government. Following this decision the provinces continued to press a claim to greater jurisdiction, and a reference in the premises was finally submitted to the Privy Council, the decision of which was given in 1898. This decision was in substance, except in those waters which at the Union passed to the Dominion under the third schedule of the British North America Act, 1867, that whatever proprietary rights in the fisheries were vested in the provinces at the time of Confederation remained their property subsequent thereto; but the exclusive power to regulate the fisheries, wherever they might be situated, is vested in the Federal Government. Immediately following this decision the different sea-washed provinces claimed jurisdiction over the tidal fisheries, not only in the rivers and estuaries, but in the bays and territorial waters along the seacoast as well. The Federal Government, on the other hand, maintained that there is a public right of fishery in tidal waters, and that, as such, it came within the exclusive purview of the Federal Government.

For years negotiations went on with the different provinces to settle the matter amicably; but this was not found to be possible, and finally in 1913 a reference to the courts was decided upon with British Columbia, in which the other provinces interested became intervenants. The decision in that case maintained the contention of the Federal authorities.

This settled the question in all sea-washed provinces, with the exception of Quebec, which contended that as the decision was largely based on Magna Charta, and that as Magna Charta did not apply to the province of Quebec, the decision did not affect the situation in that province.

In order to settle the matter speedily, it was finally agreed that a reference should be submitted to the Court of King's Bench in Quebec, under authority of a provincial

SESSIONAL PAPER No. 40

statute which was obtained for that purpose. The decision in that court was adverse to the Federal contention, but as above explained this decision was reversed by that of the Judicial Committee.

The Federal fishery regulations have been amended to place them in line with the law, as laid down by the Privy Council decision, so that during the approaching fishing season, the fisheries in the navigable tidal waters, as well as in the non-tidal portions of the streams in Quebec that are navigable and accessible by way of navigation from the sea, will be administered by this department, and no fishing in such waters will be allowed, excepting under license from the minister thereof.

INTERNATIONAL QUESTIONS

While the International Commission, that was appointed in 1918 to consider a settlement of outstanding questions between Canada and the United States, submitted a unanimous report to the respective Governments when they completed their work, it was not made public during the earlier stages of the negotiations following its submission. It was, however, published by both Governments concurrently on July 26 last, since which date copies of it have been available to those interested.

Fraser River Treaty.—Amongst the questions submitted to the commission for consideration was that of the rehabilitation and protection of the salmon fisheries of the Fraser River system, which include not only those of the estuary of the Fraser river and gulf of Georgia, but those of the northern portion of Puget sound and of the strait of Juan de Fuca as well. The commission recommended that a treaty be entered into between the two countries for the joint protection of this system of salmon fisheries, and to that end it submitted a draft of a proposed treaty and regulations thereunder. This draft treaty and regulations, with slight modifications not involving any change in intention of the treaty regulations, was approved by the two Governments and was signed at Washington on September 2, 1919. On the following day it was submitted by the President of the United States to the Senate thereof for ratification but when it came up for consideration in the Senate, objection arose to the wording of the last sentence of the second article, on the ground that under the wording thereof a person who was tried in one country for a violation of the regulations and was acquitted might be tried for the same offence, if he visited the other country, as he would not have been "punished for such offence" in the other country. Consequently on the 15th of January, the President requested the Senate to have the treaty returned to him for further consideration. This was done and on the 25th of May, 1920, an amended treaty was signed at Washington, which treaty was submitted by the President of the United States Senate for ratification on the 29th of that month, but action on it has not yet been taken by the Senate. Meantime effective measures for the building up of these fisheries are being delayed. This is exceedingly unfortunate. The existing position is aptly and concisely put in the following extract from the report of the Commission:—

The fact that these fish pass through the waters of the two countries makes it impossible to properly protect them by independent action. The fishermen of either side are inclined to operate to the limit when the fish are in their waters and place the responsibility for untoward results on those of the other country.

12 GEORGE V. A. 1922

How the fishery has declined, will be realized from the following statement of the packs of sockeye salmon for a series of years:—

YEAR.	FRASER RIVER PUGET SOUND TOTAL.		
	No. Cases.	No. Cases.	No. Cases.
1902..	293,477	372,301	665,778
1903..	204,809	167,201	372,020
1904..	72,688	109,264	181,952
1905..	837,489	825,453	1,662,942
1906..	183,007	178,748	361,755
1907..	59,815	93,122	152,937
1908..	63,126	170,951	234,077
1909..	542,248	1,097,904	1,640,152
1910..	133,045	248,014	381,059
1911..	58,487	127,761	186,248
1912..	108,784	184,680	293,464
1913..	684,596	1,673,099	2,357,695
1914..	185,483	335,230	520,713
1915..	89,040	64,584	153,624
1916..	27,394	84,637	112,031
1917..	123,614	411,538	535,152
*1918..	16,849	50,723	67,572
*1919..	29,628	64,346	93,974
*1920..	44,598	62,654	107,252
*Added.			

Two facts are outstanding:—

1. The yearly possibilities of the Fraser river must be measured by the conditions of the “big years.” All that is needed to produce the run of a “big year” any season is to have the spawning beds of the whole system seeded as plenteously in the “big years” of the past. The river is as free from pollution or artificial obstruction as it ever was, and all the conditions for successful spawning are as favourable as in early times. The only deficiency is in the spawning fish.

2. Unless drastic action is taken, internationally, to save the situation, the fishery will become commercially exhausted in a few years. The figures for 1918 clearly evidence this.

It would be an international calamity, involving almost criminal neglect, on the part of both countries if the latter condition were allowed to obtain. On the basis of the present prices, the sockeye progeny of this river should be producing, annually, a food worth over \$30,000,000, this figure being based on the actual pack of the last “big year,” 1913. As it is, the average value for the four years ending 1918 is about three million dollars.

Canada has left nothing undone that she could do to remedy this unfortunate condition.

Port Privileges Treaty.—No substantial progress has been made since the last annual report in the negotiations for a final settlement of the questions affecting privileges in the ports of either country to the fishing vessels of the other. Meantime the temporary arrangement for reciprocal privileges, which was made shortly after the Commission began its work, and at its instance, is being continued in both countries.

Pelagic Sealing Treaty.—The good effects of this treaty are becoming increasingly evident as the years go by. The condition of constantly diminishing herds, which at the time the treaty was entered into had reached dangerously near the point of commercial exhaustion, has been replaced by one of ever increasing herds.

The herds in which Canada is interested under the treaty are those resorting to the Pribilof islands, Behring sea, which are part of Alaska, the Commander islands, also in Behring sea, but which belong to Russia, and Robben island in the North Pacific ocean, which since the Russo-Japanese war has belonged to Japan. By far the largest herds are those resorting to the Pribilof islands.

SESSIONAL PAPER No. 40

The following statement shows the number of seals taken on the different rookeries and the revenue derived therefrom by Canada since the treaty became effective in 1912:—

Country.	Year	Total No. of Seals Taken.	Canada's Share.	No. Sold.	Value of Canada's Share.	Total.	Net Total.
					\$ cts.	\$ cts.	\$ cts.
<i>United States—</i>							
Advances with interest provided for by treaty.	1912	(a) 2,427	1,000	2,427	34,672 13	258,157 36	258,157 36
	1917	1,943	1,000	1,943	55,900 00		
	1918	34,890	5,234				
	1919	27,821	4,173	(b) 13,332	137,710 41		
	1920	(c) 26,648	3,997	14,840	215,622 89	443,905 43	185,748 07
							443,905 43
Exchange.							24,560 59
							468,466 02
Skins still unsold (Jan. 31, 1921).....		61,187	9,178				
<i>Russia. . .</i>	1917	806	121	121	3,051 40	3,051 40	3,051 40
	1918	none.					
	1919	636	96	Not yet sold			
	1920	no report.					
<i>Japan.....</i>	1912	139	14	123			
	1913	547	55	sold in 1917.	2,620 36		
	1914	537	54				
	1915	571	58	sold in 1918.	962 31		
	1916	none.					
	1917	none.					
	1918	550	55	Not yet sold			
	1919	555	56	"			
	1920	555	56	"		3,582 67	3,582 67
Cash received to date, Jan. 31, 1921...							475,100 09

Unsold Skins—

From United States.....	9,178
From Russia.....	96
From Japan.....	167
Total.....	9,441

(a) 3,764 were shown in last year's report; but 1,337 of these were taken in 1911.

(b) This is the number taken up to Nov. 30th, 1920. It is possible that it may be increased slightly by skins that may have been taken in December, and which have not yet been reported.

(c) The total number sold in that year was 15,275; but 1,943 of these were taken in 1917, but as Canada, in accordance with the terms of the Treaty was paid on the basis of 1,000 skins as her share that year, these are not included in the number shown as sold.

The prices for dressed and dyed seal skins reached their high water mark at the sales held in St. Louis, Mo., in February, 1920. At these sales 9,100 skins were sold, which brought an average net price of \$121.53. At the sales in May, 1920, 5,740 skins were sold. They brought an average net price of \$57.84, or a drop of 52 per cent.

It seems quite probable that there will be a further serious decline in prices so that the financial returns in the future will doubtless be proportionately less than they have been to date.

International Arrangement for Deep Sea Fisheries Investigations.—The question of international co-operation in deep sea fisheries investigations was under consideration before the war, but had to be deferred on account of it.

12 GEORGE V, A. 1922

In Europe most of the maritime countries about twenty years ago arranged for co-operation in such work and to that end they formed an association known as the International Council for the Exploration of the Sea. Permanent headquarters for this council are maintained at Copenhagen.

While Canada was urged to become a member of this council, and so contribute to the cost of its maintenance, it was felt that our problems could best be solved by direct investigation on this side of the ocean; and it was feared that there was not much likelihood that such investigation here could be expected at least for many years by the council.

As such work on this side is of common interest on the Atlantic coast to Newfoundland, the United States and Canada, and on the Pacific coast to the United States and Canada, it is obviously desirable that there should be co-operation between these three Governments in carrying it out. To this end an informal conference of fisheries experts representing the Governments of the three countries was convened at Ottawa in September last, when the following resolution was unanimously adopted:—

Be it Resolved That,—It is the sense of this meeting that, on the nomination of the fishery services of the countries represented, each of the respective Governments should forthwith designate three persons to constitute an International committee on marine fishery investigations, this committee to determine what measure of International co-operation is desirable, what general investigations should be undertaken, consider definite problems that may be awaiting study, submit recommendations to their respective Governments, and co-ordinate and correlate the results of the work.

It is the expectation that the respective Governments will undertake to provide the necessary ways and means for conducting such independent and co-operative investigations as may be adjudged desirable by the International committee.

It is recommended that the International committee establish contact with the Permanent International Council for the Exploration of the Sea.

This resolution was subsequently approved by the three Governments. Under its provisions it will be possible to guard against unnecessary duplication of effort in the different countries and to arrange for complimentary work along certain lines, so as to assure the maximum of information to be obtained with a minimum of expenditure and in a minimum time, and without the necessity of maintaining any expensive separate organization.

The Canadian representatives on this committee are:—

Wm. A. Found, Assistant Deputy Minister of Fisheries.

Dr. A. G. Huntsman, of the Canadian Biological Board.

Mr. Loring C. Christie, LL.B., Legal Advisor of the Department of External Affairs.

The United States representatives are:—

Dr. H. F. Moore, Deputy Commissioner of the United States Bureau of Fisheries.

Dr. Robt. E. Coker, Chief of the Division of Scientific Inquiry, in the Bureau of Fisheries.

Dr. Henry B. Bigelow, Consulting Oceanographer of the Bureau of Fisheries.

Up to the moment the names of the representatives of the Government of Newfoundland have not been received; but with as little delay as possible thereafter a meeting of the committee will be held to arrange the work to be undertaken during the approaching fiscal year.

SESSIONAL PAPER No. 40

INVESTIGATIONS INTO THE NATURAL HISTORY OF THE LOBSTER

Since the summer of 1914 inclusive, Dr. A. P. Knight, then of Queen's University, a member of the Marine Biological Board—he is now the chairman of that board—has spent his summers in investigating the life-history of the lobster. These investigations have been of such eminent interest and value that a summary thereof is now desirable.

Lobster rearing.—During the summer of 1914, Dr. Knight began a series of experiments to ascertain whether lobster fry could be fed and kept alive for four or five weeks after leaving the egg. Lobster hatcheries had been in yearly operations in Canada since 1891; but rearing the fry until they had become lobsterlings, that is until they were ready to sink to the bottom and adopt the life of the adult—had never been tried. This method of propagation had been in operation at Wickford, Rhode Island, from 1905 onward, and the claim was made that it was successful; hence, the demand that it should be tried out in Canada.

The method consisted in placing berried lobsters in floating boxes let down into the sea water. The boxes were ten feet long by ten feet wide by four feet deep, and had openings in the four sides, which were covered by copper wire screens. Paddles were made to revolve in each box and so cause fresh sea water to be drawn into the boxes, and the stale water forced out; thus ventilation was provided for. The fry were fed upon scrambled eggs every two hours day and night during the four weeks they were kept in confinement. They were then placed in the sea with the expectation that many more of them would grow to maturity than would be the case with newly hatched fry.

The site chosen for the repetition of the Wickford experiment in Canada was a sea pond of about five acres, which lay immediately beside the northwest end of St. Mary's bay, Digby County, N.S.

After repeated trials which extended over two summers in this location, the method was abandoned as a failure. Not a single fry had reached the third stage, though a few hundred had lived for seventeen days. The immediate cause of death was in most cases the accumulation of a large number of diatoms (microscopic plants) about the mouth parts, so that the animal was unable to eat. It is almost certain, however, that the true cause of death was the low temperature of the water. In Rhode Island waters, the temperature varied from 68° F. to 72° F.; at the west end of St. Mary's bay from 50° F. in June to a maximum of 60° F. in August.

For the next two summers the apparatus was used near Pictou on Northumberland strait. Here there was no difficulty in rearing 4 per cent of the fry until the lobsterling stage, the temperature varying around 68° F. The cost however, was out of all proportion to the number of fry that could be obtained, and hence the attempt to propagate the lobster by this method was abandoned altogether.

Lobster Mating.—While the experiments in St. Mary's bay turned out to be a failure, there grew out of them a discovery that may yet be of great importance in lobster propagation. Dr. Knight's discovery was that if mature male and female lobsters be confined in compartments during the breeding season, many more of the females will become egg bearers than is the case when they roam at large in the sea. This discovery was a matter of accident, and was rendered possible by the facilities afforded by the pound which the department had erected in the Long Beach pond for the retention of egg-bearing lobsters during the legal fishing season for liberation when such season had ended. The discovery came about in this way. Up to 1914 the prevalent opinion among lobster experts was that females which bore eggs, say in the summer of 1914, would not again produce eggs until the summer of 1916. They would cast their shells in the summer of 1915 but bear no eggs.

To test the accuracy of this opinion 47 females and 15 males were placed in a latticed pen in the pond. The pen was only twenty feet long by ten feet wide. This was about the middle of June. On August 12, the whole 62 were dipped up to see

12 GEORGE V, A. 1922

what condition they were in. Much to the surprise of everyone, 36 per cent of the females carried eggs. The surprise was not lessened when it was discovered that by the end of September the percentage had increased to 64: that is 30 of the 47 females carried eggs. The 17 which had not extruded eggs were the smaller ones.

Careful inquiries amongst nearly all the lobster fishermen at the west end of St. Mary's bay, and on the south shore of the Bay of Fundy elicited the fact that not over one per cent of the females which were caught in lobster traps ever carried eggs.

However, the Biological Board realized that inquiries amongst fishermen and mere speculation were not going to settle the question of the percentage of berried lobsters occurring naturally in the seed. Accordingly at the request of the board, the department sent out its naturalist, Mr. Andrew Halkett, for part of each of the summers of 1916 to 1920 inclusive, with instructions to accompany lobster fishermen in their boats, and ascertain exactly what percentage of berried female lobsters were caught in traps. He visited hundreds of places along the coast of the Maritime Provinces and found that the percentage varied from zero as a minimum in some places to a maximum of 14 per cent at Pugwash, N.S. The average for the whole coast varied between four and five per cent.

Concurrently with these determinations of the percentages of berried females occurring among the lobster population of the sea, experiments were continued in St. Mary's bay, at Pictou, N.S., and at St. Andrew's, N.B., as to the results of confining male and female lobsters in latticed pens during the breeding season of 1915. In all three cases, the general results were the same—there was a marked increase of berried females, for example the percentage in the mating pens in St. Mary's bay was 25; at St. Andrew's, 36; and at Pictou, 66. In 1916 mating experiments at the same three places showed an average of 40 per cent of berried females as compared with an average of 4 per cent in the sea immediately alongside of the mating pens. At Bay View the percentage was 66.

In 1917 the St. Mary's Bay pond was selected as the place in which mating could be put to its severest test. The pond is unsuitable for the purpose. Sulphuretted hydrogen (gas) exudes from the soft slimy bottom during the whole summer and algae growths soon accumulate upon the animals. Notwithstanding these drawbacks, it turned out that out of 1,000 females placed in the pond, 40 extruded eggs. How does this compare with the percentage of egg bearers in St. Mary's bay? Fishermen's traps showed a percentage of 1.22. That is, mating in lobster pens in the sea pond showed an increase of 330 per cent over the percentage naturally occurring in St. Mary's bay.

In 1918 mating experiments were continued in what is usually considered two of the most favourable localities in Northumberland strait, viz., at Tormentine and cape Traverse. At Tormentine out of 21 females which were mated with 21 males, 12 extruded eggs, or 57 per cent. At cape Traverse 24 females were mated with 24 males, and 12 extruded eggs, or 50 per cent.

To sum up then, during the five summers that mating experiments were carried on in latticed pens, the results show a very great increase of egg bearers over the numbers found to occur naturally at sea. What is the explanation? It would appear to be this. Mating in the sea at the present time would seem to be largely a matter of accident. It is said that the male does not seek out and immediately recognize a female. He, therefore, like the male crab, "tries" every lobster he meets—male and female alike. If a female does not chance to meet a male, her eggs are extruded just the same, but being unfertilized they "go bad" and of course produce no larvae. The fewer lobsters there are and the wider range over which they are distributed, the less the chances for mating and the fewer the numbers of berried females. In fact the same law operates in the sea as on the land. As the forest becomes cut down the wild animals which inhabit it become more and more scattered, and the production of young is decreased. Notwithstanding the indirect advantage that would

SESSIONAL PAPER No. 40

result to the lobster industry if mating were systematically carried on by fishermen in areas that are especially suitable for lobster production, it is nevertheless true that neither fishermen nor canners have shown any disposition to put mating into practice. This is not to be wondered at. Hitherto nature has furnished immense numbers of animals without labour and without cost and as long as the natural supply keeps up men will catch all they can, until the numbers dwindle and fishing becomes unprofitable, or at any rate less profitable than fishing for other species. Should that point ever be reached in the lobster fishery, then the fishermen will no doubt turn to the mating of lobsters and co-operate with the Department in other practical forms of restoration and conservation. But that time has not yet come and with the close protection the fishery is now receiving, which has been made possible by the reorganized service, and with the evident good results in the way of the preservation of the berried lobster by the fishermen themselves, following the educational campaign carried on amongst the fishermen and canners, there is excellent reason to believe that such time will never come. Not only has the decline in the number of lobsters been permanently arrested, but a building-up process has been begun.

Educational Campaign.—The beneficial results that followed the educational campaign that was carried on amongst the lobster canners and fishermen in 1918 and again in 1919 were explained in the last annual report. These campaigns were followed during the winter of 1920 by a series of illustrated addresses by the department's naturalist, Mr. Andrew Halkett, in western Nova Scotia. Much interest was manifested by the fishermen in these addresses and helpful discussions followed them. Similar work is being carried on by him in Prince Edward Island during the present winter.

It is hoped that by such methods not only will the fisherman's knowledge of the natural history of the lobster be much enlarged but that his active sympathy and co-operation will be secured in affording the fishery the protection it must have if it is to be built up to a maximum of productivity.

Observations on the Scallop at Mahone Bay, N.S., and Digby Basin, N.S.—Mr. Andrew Halkett, naturalist of the department, continued his observations on the scallop at Mahone bay. These were similar to those made in the preceding year and published in the report for that year.

The observations at Digby basin led to the conclusion that important scallop beds exist therein.

FISHWAYS

For many years one of the most difficult problems with which the department has had to deal in the protection of our anadromous fishes, and particularly salmon, shad and gaspereau, in our Atlantic rivers, has been the damming of such rivers for power purposes. This problem is beginning to be experienced to some extent in British Columbia, and it will no doubt grow there. With the increasing demand for water power the problem is becoming greater, as larger and higher dams are being built. Not only are these higher dams more difficult to equip with fishways that ascending fish will readily take, but as soon as the time of high water is over they frequently require the full flow of the stream for their power wheels, thus leaving the fishway and sometimes a stretch of the river bed below it so nearly high and dry as to be useless for the purpose intended.

The owners of dams built across important streams have for years been required to equip them with fishways. While these fishways seemed to afford a ready and easy means of ascent for fish, as a general thing it was found that fish were using them to a very limited extent. Hence the fish were being largely prevented from reaching their natural spawning grounds.

12 GEORGE V, A. 1922

During the past three years the department has been having its fisheries engineer devote special attention to the fishway problem. The results are highly promising. A report by the engineer dealing fully with the work done in this connection during the year is appended hereto.

INSPECTION OF FISH

During the season of 1920 the inspection of pickled fish and barrels was carried on as in the preceding year under authority of the Act of 1914. There were employed one inspector in Nova Scotia, one in New Brunswick, and one during the winter herring season in British Columbia. Owing to the unsatisfactory condition of the markets for all cured fish, and the high price of barrels and salt, the pack of pickled fish in 1920 was much below normal. Inspection was, of course, optional, and while the number of packers who took advantage of it in the past season was greater than in the preceding one, the number of barrels submitted for inspection was slightly less. The following table shows the number of packers who presented their fish for inspection, and the number of barrels inspected annually since the inspection was made available:—

Year.	Packers	Barrels inspected
1915..	16	1,320
1916..	73	7,213
1917..	80	8,977
1918..	110	20,664
1919..	82	8,730
1920..	105	8,082

While our educative and persuasive efforts under an optional inspection Act have on the whole accomplished a good deal in the way of inducing the trade to use better barrels, and to pack better fish, experience has made it clear that the means provided by such an Act were not suited for securing speedy general improvement. A system of inspection which requires inspecting officers to plead with packers to submit their product for inspection is very far from being a satisfactory one, because it makes it difficult for them to condemn the inspected product if not quite in accordance with the requirements of the Act. It was realized that so long as inspecting officers are without authority to insist on at least some of the essential points in the construction of packages, and the packing and marking of fish being complied with, the bulk of the Canadian output would continue to be marketed as poor grade stuff in inferior packages, and result in the nullification of the efforts of those packers who are endeavouring to build up a name for Canadian goods by producing a higher grade article. The department was driven to the conclusion, therefore, that the Act of 1914 required amending in order to give power to the inspecting officers to compel all coopers and packers to comply with its provisions. In this the department had the strong backing of the Canadian Fisheries Association, the Halifax Board of Trade, the Vancouver Board of Trade, the Commissioner of Fisheries for British Columbia, the now defunct Canada Food Board, and of many individual fishermen, coopers, packers and dealers.

Under the Act of 1914, when a packer desired to have his fish inspected, he notified an inspector, who visited his curing place, carried out the inspection there, and put an official stamp on such of the fish as may have been worthy of it. The experience of the past few years led to the belief, however, that that system of inspecting and branding could not be satisfactorily carried out under a compulsory standard of packing except by the employment of a very large and expensive staff of inspectors, owing to the enormous number of individual packers scattered over thousands of miles of coast line, and the greater quantity of fish that would, therefore, have to be dealt with. Consequently, the question as to what system would be

SESSIONAL PAPER No. 40

most acceptable, effective and economical in applying the principle of compulsion was duly discussed with those directly engaged in the business, and the conclusion was reached that a system somewhat similar to that under which the inspection of fruit is carried on should be applied to the inspection of fish.

During the last session of Parliament, therefore, the Fish Inspection Act of 1914 was amended by the Fish Inspection Act of 1920, which provides authority for carrying on the inspection of fish and packages along the lines proposed. The amended Act became operative on the Pacific coast on November 1, 1920, and on the Atlantic coast on April 1, 1921. Its main purpose is to require that all pickled fish be fit for human food; that such fish be packed in water-tight barrels of a standard size; that the barrels contain the proper weight of fish, and that the fish be as represented by the marks placed upon the barrels by the packer. Fish packed by fishermen or other persons for their own use, and not intended to be sold, are exempted from the provisions of the Act.

The following is a summary of the requirements of the Act and of the regulations made thereunder:—

1. All barrels or other containers in which pickled herring, alewives, mackerel and salmon, except mild-cured salmon, are to be packed and marketed must be made in accordance with the standards defined in the new regulations, and marked by the maker with his name and address. The length and thickness of staves are to be as defined in the regulations made under the Act of 1914. In other respects the standards of requirements for barrels, with one or two minor exceptions, are similar to those defined in the old regulations.

2. All herring, alewives, mackerel and salmon, except mild-cured salmon, packed in salt and pickle in water-tight barrels or other containers, must be cured and packed in accordance with the requirements of the new regulations.

3. On the end of each barrel or container filled with either of the above-named kinds of pickled fish must be stencilled by the packer or the first dealer who repacks or reconditions the fish his name and address, the grade and the weight of the fish in the barrel or container. Pickled fish shipped by a packer to be repacked or reconditioned by the first dealer or buyer in Canada, if ungraded, may be marked "ungraded" but the containers and fish must in other respects be in accordance with the requirements.

4. Competent inspectors will visit coopers' shops and curing places for the purpose of giving instruction and advice, but the new Act does not require them to visit such for the purpose of stamping or branding the output of coopers and packers. There will be no official brand.

5. Coopers must see to it that their barrels are properly made and that their name and address is shown thereon. Packers or repackers must likewise make sure that their fish are properly packed and that the marks they place on the containers truly and correctly represent the contents.

6. At any time or place which may be found suitable or convenient, after the barrels or containers have been packed with fish, marked and made ready for market, an inspector may examine samples of the containers and fish in order to assure himself that the containers are in accordance with the standard, and that the fish are as the marks on the containers represent them to be.

7. When an inspector finds barrels or other containers, in which pickled fish are packed, not up to the standard, he will mark such barrels or containers with the words "Container below standard," and when he finds that such barrels or containers do not show the name and address of the maker, he will hold them until such name and address is ascertained. For such violations the barrel maker becomes liable to a fine not exceeding fifty dollars for a first offence.

12 GEORGE V, A. 1922

8. Further, when an inspector finds that the fish are not of the grade or not of the weight shown by the marks, or not of good quality, he will mark the containers with the words "Fish below grade," "Fish below weight," or "Fish below quality," as the case may be, and the packer or repacker of such fish becomes liable to a fine not exceeding fifty dollars for a first offence.

9. When an inspector finds that the barrels or other containers have no marks to show the grade and weight of fish, or if the name and address of the packer or repacker is not shown, he will seize and hold such fish until such name and address is ascertained, and the packer or repacker, in such a case, becomes liable to a fine not exceeding fifty dollars for a first offence.

10. An inspector may detain, for the time necessary, to carry out an inspection, any shipment of pickled fish if he has reasonable grounds for believing that the marks on the containers constitute a violation of the Act. In such a case he will immediately notify the packer or owner.

11. Pickled fish imported into Canada for sale must be packed in barrels similar in character and equal in quality to those required under this Act. The marks on the barrels must show the kind, grade and weight of fish and the country of origin. The name of the country of origin only is required to be shown on barrels of pickled fish imported for exportation.

12. In the event of a dispute between an inspector and the packer or owner as to quality, weight or condition of the fish or the size or condition of the containers, the packer or owner may appeal to the Minister who may order a reinspection.

In order that all fishermen, coopers and packers, who are directly concerned, might be fully informed of the Act's requirements, the forgoing summary was printed and distributed to them immediately after the passing of the Act. Complete copies of the Act and the regulations made thereunder were likewise distributed as soon as such were available.

CANNERY INSPECTION

Under authority of the Meat and Canned Foods Act the inspection of all fish and shell-fish canneries and of the packing operations therein, was carried on during the packing season of 1920, as in the past, by the department's outside staff of fishery officers.

This inspection has a twofold object: (a) the extension of trade, by improving the quality of the product; (b) the protection of the public, by preventing the packing of unsound fish and insisting that all cans of fish be correctly labelled.

On the Atlantic coast there were in operation 588 establishments canning lobsters, 2 canning sardines, 5 canning clams and scallops, and 22 canning other fish, such as mackerel, cod, haddock and herring; while on the Pacific coast there were 66 establishments canning salmon, 6 canning herring, pilchards, etc., and 1 canning crabs. There were in all 1,622 formal inspections made and reported on during the season, in addition to many more incidental visits of inspection.

A number of defects, such as unsatisfactory ventilation and drainage, defective coolers and utensils, were noted and corrected. In several cases licenses were withheld until the canners were made to comply with the standard of requirements. One cannery which was found to be without proper sanitary equipment for the use of the employees was made to provide such under threat of closure.

The Act, as amended November, 1919, provides definite weights of dried lobster meat for the various sizes of cans thereof, and was enforced for the first time during the past season. At the beginning of the lobster canning season in western Nova Scotia and Prince Edward Island, cans which did not contain the prescribed weight of lobster meat were found in some of the canneries. One canner was prosecuted, but the evidence showed that while some cans were under weight others were full

SESSIONAL PAPER No. 40

weight and some even over weight. In some instances it was found on a reinspection, after some weeks, that the meat had absorbed so much of the liquid as to bring it up to the full weight. As there did not appear to be any intention on the part of this packer to defraud, the case was dismissed.

The whole matter of dealing with the packing of light-weight cans of lobster was found to be a difficult one to handle, owing to certain loopholes in the Act, which came to light during its enforcement. The action taken, however, and the activities of the fishery officers in warning lobster packers against packing light weights, have done much good, inasmuch as packers, realizing that the law was being enforced in earnest, immediately began to exercise the greatest care in seeing that the proper amount of meat was put into each can, and it seems highly probable that there will be little trouble in this respect during the season of 1921.

A great deal of trouble was experienced in the course of the past year in enforcing the labelling requirements for the various kinds of canned fish. Some which were found to be wrongly labelled were held until relabelled; a quantity of salmon found on sale in British Columbia under misleading marks were seized and confiscated; several lots of canned fish, imported for sale in Canada, found to be either wrongly labelled or without labels of any kind, were refused entry until the labelling requirements had been complied with.

It is felt, however, that most of the troubles which were met with in the past year will not recur in the coming year, as packers, taken as a whole, have been found really anxious to comply with the provisions of the Act.

FISHERIES STATISTICS

Under an arrangement between this department and the Dominion Bureau of Statistics, the latter now compiles and publishes the annual statistics relating to the fisheries, as Part III of its Census of Industry. The information is secured partly from manufacturing establishments, on individual schedules designed to fit in with the bureau's general scheme of securing industrial statistics, and partly by the officers of this department, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department, and afterwards handed over to the Bureau of Statistics for publication. A general review only, made up from information obtained by the department from time to time, is given in this report.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea-fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department and made public through the press, monthly.

Once every three months the monthly information is compiled to show the total landings of the various kinds of fish for the quarter by provinces and for the whole of Canada. This is printed and published in the form of a Quarterly Bulletin and distributed to the trade and all directly concerned. The Quarterly also contains summaries, made up from official monthly reports of the landings of fish in the United States, England, Scotland, Ireland and of certain kinds in Norway.

FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

12 GEORGE V, A. 1922

For the year 1920, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7.60 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$6.10 each.

There were 9,671 bounty claims received and 9,664 paid. In the preceding year, 13,068 claims were received and 13,061 paid.

The total amount paid was \$152,519.30, allocated as follows:—

To 612 vessels and their crews, \$53,577.80.

To 9,052 boats and their crews, \$98,941.50.

SESSIONAL PAPER No. 40

Provinces and Counties.	Number of Vessels.	Tonnage.	Average Tonnage.	Number of Men.	Amount Paid.	Number of Boats.	Number of Men.	Amount Paid.	Total Bounty Paid to Vessels and Boats, 1920.
					\$ cts.			\$ cts.	\$ cts.
<i>Nova Scotia—</i>									
Annapolis	1	60	60	20	212 00	115	190	1,268 90	1,480 90
Antigonish						121	182	1,231 20	1,231 20
Cape Breton	16	212	13	64	691 00	222	385	2,556 50	3,247 50
Cumberland						2	3	20 30	20 30
Digby	4	118	30	29	338 40	319	534	3,574 40	3,912 80
Guysboro	56	877	16	248	2,736 60	619	980	6,586 80	9,323 40
Halifax	59	891	15	249	2,764 20	1,027	1,392	9,540 60	12,304 80
Hants	1	14	14	2	29 20			29 20	29 20
Inverness	22	342	16	106	1,136 80	288	569	3,759 90	4,896 70
Kings	1	11	11	3	33 80	43	61	415 10	448 90
Lunenburg	144	9,295	65	2,422	27,627 60	536	651	4,514 00	32,141 60
Pictou						39	51	344 10	344 10
Queens	12	231	19	62	697 40	158	249	1,683 00	2,380 40
Richmond	31	561	18	156	1,726 20	355	608	4,059 80	5,786 00
Shelburne	25	660	26	185	2,045 60	534	957	6,368 70	8,414 30
Victoria	12	181	15	52	576 40	236	351	2,373 10	2,949 50
Yarmouth	21	1,151	55	348	3,775 40	88	180	1,186 00	4,961 40
Total	405	14,604	36	3,946	44,390 60	4,702	7,343	49,482 40	93,873 00
<i>New Brunswick—</i>									
Charlotte	6	90	15	23	253 60	303	499	3,344 90	3,598 50
Gloucester	177	2,673	15	721	8,064 60	66	135	889 50	8,954 10
Kent	7	70	10	18	206 80	57	119	782 90	989 70
Northumberland	1	21	21	4	51 40	1	3	19 30	70 70
Restigouche	1	11	11	1	18 60	1	1	7 10	25 70
St John						12 ⁴	19	127 90	127 90
Westmorland						1	1	7 10	7 10
Total	192	2,865	15	767	8,595 00	441	777	5,178 70	13,773 70
<i>Prince Edward Island</i>									
Kings	4	67	17	13	165 80	312	433	2,945 30	3,111 10
Prince	5	77	15	20	229 00	275	498	3,261 80	3,490 80
Queens	3	36	12	7	89 20	104	216	1,419 60	1,508 80
Total	12	180	15	40	484 00	691	1,147	7,626 70	8,110 70
<i>Quebec</i>									
Bonaventure	1	11	11	2	26 20	216	374	2,479 50	2,505 70
Gaspé	1	10	10	4	39 20	2,182	3,982	26,250 20	26,289 40
Rimouski						50	74	501 40	501 40
Saguenay	1	20	20	3	42 80	770	1,121	7,422 60	7,465 40
Total	3	41	14	9	108 20	3,218	5,551	36,653 70	36,761 90
Grand Totals	612	17,690	29	4,762	53,577 80	9,052	14,818	98,941 50	152,519 30

establishment on Coldwater creek, tributary to the same lake, which was put out of commission by abnormal freshets three years ago. The hatchery building is 110 feet long by 40 feet wide with an L 16 feet by 20 feet; walls 10 feet high and roof carried on ten trusses. The equipment includes one hundred and twenty hatching troughs having a total capacity of ten million eggs. A central floor drain, the full length of the hatchery, 6 feet wide and from 18 inches to 2 feet in depth, into which the water from the troughs discharges provides considerable space for fry, which will relieve the troughs during the hatching period. The other buildings include the superintendent's dwelling, which is a four-room bungalow, 25 feet 6 inches by 30 feet; living quarters for the staff, which is a two-storied seven-room building, 25 feet by 30 feet, and a boathouse with a landing stage. All the buildings are constructed with concrete foundations and the hatchery with concrete floor throughout. Both dwellings are modern, with basements, hot-air furnaces and sanitary plumbing. The construction was carried on by day labour, under the direct supervision of the Fisheries resident engineer for British Columbia.

There are now thirty-five main hatcheries, eleven subsidiary hatcheries and six salmon retaining ponds in operation, from which the total distributions of the different species in each province during the season of 1920 was as follows:—

Nova Scotia—

Atlantic salmon..	6,487,750	
Rainbow trout..	105,000	
Speckled trout..	165,000	
		6,757,750

New Brunswick—

Atlantic salmon..	10,083,444	
Rainbow trout..	12,500	
Speckled trout..	328,403	
	<hr/>	10,424,347

Prince Edward Island—

Atlantic salmon.. . . .	860,140
Speckled trout.. . . .	124,265
	<hr/>
	984,405

Quebec —

Atlantic salmon.. . . .	2,376,581
Speckled trout.. . . .	179,633
	<hr/>
	2,556,214

Ontario —

Spring salmon.. .. .	433,200
Whitefish.. .. .	205,662,500
Salmon trout.. .. .	20,401,252
Cisco.. .. .	40,800,000
Pickereel.. .. .	120,400,000
	<hr/>
	387,696,952

Manitoba—

Whitefish..	201,111,250	
Pickrel..	25,353,600	
	<hr/>	226,464,850

Alberta —

Rainbow trout.. .. .	607,660	
Cutthroat trout.. .. .	432,752	
Salmon trout.. .. .	174,441	
		1,214,853

British Columbia—

Cutthroat trout.. .. .	172,075	
Steelhead salmon.. .. .	107,454	
Kamloops trout.. .. .	238,805	
Sockeye salmon.. .. .	90,175,369	
Albino spring salmon.. .. .	4	
Spring salmon.. .. .	3,951,253	
Kennerly's salmon.. .. .	1,034,000	
Coho salmon.. .. .	2,243,403	
Pink salmon.. .. .	4,264,050	
Chum salmon.. .. .	584,000	
Speckled trout.. .. .	6	
Whitefish.. .. .	11,517,000	114,287,419

Total distribution..	750,386,790
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12 GEORGE V, A. 1922

As above indicated, experiments have been carried on with different kinds of food for young fish, prepared in various ways and fed in different rotations. Experiments have also been made in hatching eggs in gravel under conditions as near those of nature as possible. This method has yielded most satisfactory results in some instances, but further experiments are necessary before the method can be adopted on a larger scale. Under certain conditions, it provides an efficient means of stocking isolated waters to which fry cannot be conveyed from existing hatcheries. The stocking of lakes, barren of fish life, but containing an abundance of natural food, has proven most efficient. Sockeye fry in some instances have attained, in from seven to ten weeks, a growth equal to the average growth attained by the Fraser river sockeye in one year.

The acclimatization of the better varieties of food and sporting fish has also been achieved. The eastern speckled trout and whitefish have been established in considerable areas in British Columbia, and encouraging returns are apparent from the distribution of spring salmon in certain tributaries of lake Ontario. The introduction of bass and other fish of predatory habits into salmon and trout areas, on account of the harm that might be done to the young of these species is discouraged.

Investigation of the spring and autumn runs and the possibility of these runs comprising two races of salmon in the Atlantic rivers has been continued. In the Miramichi and Margaree rivers, where the late run predominates and parent salmon are caught during their upward migration, after August 25, eighty per cent of the recaptures were caught before August 15 and less than twenty per cent after that date. Adjoining rivers, similar in character, are being stocked, in one case with the fry from a river in which the run is predominately early and in the other case from a river in which the late run predominates and the early run has practically ceased to exist.

The good effects of fish culture have become more and more apparent on all sides. Very few salmon ascended the rivers of Prince Edward Island previous to the establishment of the hatchery in 1906, but as a result thereof all of its rivers and larger brooks were practically teeming with salmon during the last spawning season. Salmon have not been seen in the Nashwaak river, N.B., for over fifty years, but as a result of systematic stocking it carried a heavy run last season. Notwithstanding the fact that the close season was recently abolished in the Great Lakes, the whitefish fishery is increasing steadily and the catch per net in lake Winnipeg was last year greater than it ever was. The upper waters of the Fraser river, B.C., where no hatcheries have been operated, have for several years been practically depleted of salmon, while good runs have annually occurred in the lower reaches where several hatcheries are located. There was a larger number of spawning sockeye in the Birkenhead river last year than there has been for thirteen years past. The Fraser river situation, however, cannot be successfully handled otherwise than by proper international co-operation. The run of sockeye to Anderson lake, Vancouver island, was fifty per cent greater than it was in the previous year, which was the best for ten years previously. It is estimated that not less than seventy thousand sockeye reached the spawning areas of this lake. Definite runs have been established in many areas to which sockeye did not resort before they were stocked from the hatcheries, and most satisfactory returns are apparent from several of the prairie lakes that have been stocked with whitefish. Whitefish are also returning to the southerly portion of Georgian bay, as a result of the Collingwood hatchery.

A report in detail of the fish cultural operations of the Department is being published in pamphlet form.

OYSTER CULTURE

The officer in charge of this service examined the various oyster fishing areas in the gulf of St. Lawrence and cleaned the beds which required cleaning.

The Bay du Vin area was found to be in a satisfactory condition.

SESSIONAL PAPER No. 40

In Richibucto river the oysters transplanted two years ago were examined and found to have grown considerably.

The grounds at Caribou, N.S., where oysters from the United States and Prince Edward Island had been planted some years ago, were found to be clean and in good condition. The oysters have grown well, especially those from Prince Edward Island. But no evidence of spat or young oysters could be discovered and the officer is of the opinion that reproduction has not taken place because the water in which the oysters were transplanted is of much greater salinity than that from which they were taken.

The oysters planted in the harbour of Brule, N.S., during the spring of 1919 were found to be growing remarkably well. There was practically no mortality in this transplanted lot.

In Charlottetown harbour and surrounding waters the beds are in good condition. Here during the oyster fishing season the officer boarded the boats, inspected the catches and gave advice to fishermen with respect to culling the undersized oysters and returning them to the beds.

The areas in Richmond bay, P.E.I., which became depleted a few years ago by a disease which practically killed all the oysters, show no signs of improvement yet. The beds, both public and private, as a result of not being fished in the last two or three years are becoming overgrown with eel grass and mussels.

The beds in Cascumpeque bay seem also to have fallen a prey to the disease since last year, as no live oysters were caught there except on some fresh beds in Kildare river.

BIOLOGICAL STATIONS OF CANADA.

The two Biological Stations under the direction of the Biological Board of Canada had the most successful season during 1920 in the history of biological research in Canada. In addition to the paid staff of eight persons in the station at Saint Andrews, there were nearly twenty scientists who carried on investigations. Professor A. B. Knight, Kingston, Ont., chairman of the Biological Board, conducted some difficult and lengthy experiments on the influence of temperature on newly-hatched lobsters and he devised a method of rearing them to a somewhat advanced stage. When Professor Knight left for Prince Edward Island at the end of July, Professor Prince continued the investigations and a number of young lobsters were reared through a series of the early stages and these stages were preserved so that it would be possible to prepare a very detailed report on the changes which these young lobsters undergo in their early life history. Professor L. W. Bailey, Fredericton, continued his studies of Canadian Diatoms and paid special attention to a valuable collection from Quill lakes, Sask.; Professor A. W. Willy, McGill University, examined a large collection of Plankton material from the Miramichi river. He drew up descriptions of a series of Copeoda, which will be of great importance in connection with the feeding habits and migration of the smelt and other fish inhabiting the river. In addition, he studied the microscopic Crustaceans from Quill lakes, which had been obtained during the early summer; Dr. F. C. Hainsman, McDonald College, spent a short period at Saint Andrews superintending the scheme for studying of fish bacteriology; Professor Cox, Fredericton, concluded the important study of the life-history of the tom-cod. The Station was fortunate in having Professor Clara Benson at Saint Andrews, carrying on elaborate investigations into the chemistry of the flesh of various fishes; and Miss McFarlane, Toronto; Miss Symons, McGill University, and Miss Williamson, Columbia University, engaged in the bacteriology of lobsters, clams, etc., the last named also studying the important question of the alleged shrinkage in weight of lobster meat after undergoing the canning operation; Dr. F. S. Jackson, McGill, completed some remarkable studies on the changes undergone by the muscle of fishes during the freezing process, a subject of very great practical importance from a food point of view; Pro-

12 GEORGE V, A. 1922

fessor J. W. Mavor, Schenectady, continued his important work in determining the movements of water in the Bay of Fundy, his results, which included the summarizing of a large number of records of floating bottles placed in the currents of the bay, seem to show that these are much more complicated than had been supposed, and the whole investigation will be one of very great interest when published; Professor Connolly, Antigonish, N.S., made a biological study of the young stages of certain Decapod Crustaceans; Miss E. K. Chant, Toronto, completed a report of the life-history of the smelt of the locality, including a very interesting study of the eggs and young stages; while Miss M. A. Reid, of Toronto, pursued investigations upon the eggs and changes in the life-history of a peculiar marine animal, called *Sagitta*. Professor A. Vachon, Laval University, Quebec, made chemical and physical examinations of samples of water from western lakes, including the Quill lakes. In addition, to the biological work carried on in the Station and in the waters adjacent to Saint Andrews, researches on the life-history of the shad were made by Mr. A. H. Leim, of Toronto, in the waters at the head of the Bay of Fundy, and Professor Knight, Mr. D. A. McKay of Ottawa and Professor A. B. Dawson, Loyola College, Chicago, completed further investigations on the lobster fisheries, which have formed the subject of elaborate studies for several seasons. The researches of the young lobsters and their behaviour in early life formed an important part of the work, and a report of great value to the fisheries is in preparation. The board took advantage of an opportunity which offered itself of procuring biological collections from the east shore of Hudson bay and James bay. Mr. Frits Johanssen was given by the department a sufficient vacation to visit these regions, where very little hitherto has been ascertained as to the biology and general conditions of the fisheries of these waters. This observer was instructed by the board to visit this remote area and has brought back a very important collection of fishes and all marine life, which will be of unusual interest when reports upon it are completed.

Professor A. D. Robertson, London, Ont., assisted by Mrs. Robertson and a small staff, extended his oyster studies on certain important beds in Prince Edward Island. The several reports which Dr. Robertson has previously made upon the oyster areas will receive important additions and be supplemented extensively by a further report on the work carried on during the season of 1920. Professor A. G. Huntsman, curator of the Station, and who had general direction of the biological researches carried on, was at Saint Andrews from June to late October, and in addition to his onerous duties as head of the Station, he studied the influence of light on the growth of mussels, and superintended the smelt and *Sagitta* investigations, as well as conducting the dredging and other investigations in the open sea.

Much material has been supplied to Principal Harrison to aid him in his investigations at MacDonald College upon the canning of lobsters and curing of fish; and Miss Fritz, of Toronto, also continued the study of material which had been collected on the Miramichi region in 1918.

A very important piece of work was carried on from October 8 to 12 in a series of tow-net operations off Southern end, Grand Manan, in order to ascertain the distribution and movements from the spawning ground, in that vicinity of vast schools of young herring occurring there. In August and September several Hydrographic and Plankton expeditions were made in the Bay of Fundy when drift bottles were put out in order to obtain the records of the movements and currents desired by Professor Mavor, and some similar studies including a general Faunistic investigation, was made at the Minas basin and other waters at the head of the Bay of Fundy.

In September it may be added, that Professor Prince and Professor Huntsman left the Station to give technical instruction to fisheries officers at Truro, N.S., when a large assemblage of the inspectors from all parts of the Maritime Provinces met together under the chairmanship of Chief Inspector Ward Fisher, and a very successful

SESSIONAL PAPER No. 40

series of sessions were held and important information on fish and fisheries imparted. Several biological lectures were delivered by arrangement in Truro at the same time and were largely attended by the Normal School teachers and the public.

The Fisheries Museum at the Station which has proved a great attraction each season, has been much curtailed owing to the necessity of placing research tables between the museum cases, a condition necessary owing to the very large staff of workers who attended during the season of 1920. A refrigeration apparatus divided into three compartments has been constructed for experimenting with frozen fish and other sea produce. An ammonia refrigeration machine has been installed, in order to control the temperature. The library has received considerable additions, and the catalogue has been very much extended so that the staff can make constant use of the valuable works now on the shelves.

The Biological Board has been impressed by the necessity of increasing the accommodations, both in the laboratory and in the residence for workers, as there is every possibility that the number of Canadian scientists in future seasons will be greatly increased and accommodation must be found for them. The heating and lighting of the buildings requires also improvements, and a plan for extension and for installing electric light, etc., is now before the Board.

Pacific Biological Station, Nanaimo, B.C.—The Station at Nanaimo has had a very profitable season under the direction of Dr. C. MacLean Fraser. In addition to important Faunistic and fishery investigations conducted by Dr. Fraser himself, Mr. C. Berkeley, the assistant, has also been engaged in chemical and bacteriological investigations. The staff included a number of workers from the University of British Columbia and it is certain that in the future there will be an increasing number of able workers sent to the Station each season from the university. Dr. Fraser was offered the Professorship of Zoology by the University, which he accepted after consultation with the Biological Board and the completion of an arrangement whereby he can still continue as head of the Station and direct all investigations. He will also carry on his work in the university as professor, which will be invaluable to the work at Departure bay. Professor A. T. Cameron, Winnipeg, resided at the Station during the season and carried on some valuable researches in addition to the splendid investigations which he had begun in British Columbia waters in the spring season. Professor J. B. Collep also returned to the Station and engaged in some very elaborate biochemical investigations upon certain fish and other forms. A considerable amount of Faunistic work was done and a series of problems relating to fisheries which the department in Ottawa had handed to the Biological Board, were investigated at the Station and reports upon them have been prepared or are in course of preparation.

The biological volume which was announced as nearly ready for publication last year has been delayed, and this delay has enabled several new papers to be included so that the publication entitled, "Biological Contributions, 1918-20," will include no less than sixteen very valuable reports containing original results on fishery and other investigations carried on by the staff at both laboratories. There is a great demand among scientists in Canada and the various parts of the world for these publications, which are sent to a large number of the principal libraries in the Dominion and Europe. It may be added that Professor Prince, after occupying the position of chairman of the board for over twenty years, has retired from that position, and Dr. A. P. Knight, of Kingston, has been chosen for the position, but Dr. Prince will continue to act as secretary-treasurer of the board. Professor Ruttan, it may be added, has replaced Professor Adami as representative of McGill University, Dr. Adami having accepted the position of Chancellor of the University of Liverpool, England.

12 GEORGE V, A. 1922

REVIEW OF THE FISHERIES OF 1920

The year 1920 has been a rather trying one for the industry as a whole. During the war, and since, the cry of the world has been for increased production of food. To this cry the fishing companies and the fishermen, even though inroads had been made on their numbers by enlistment, splendidly responded; but since the armistice there has been a serious drop in the consumption of fish and a consequent slowing down in the demand therefor. One result was a sharp reduction in the prices of fish, but unfortunately this reduction reflected itself more speedily and in greater degree on the producer than on the consumer. On the other hand the equipment with which the fishermen were supplied had been purchased at high-water prices, and from which there was little reduction when replacements had to be made during the year.

The canning industries on both coasts have carried on under heavy handicaps. The prices paid for tin plate were very high and labour costs continued heavy throughout the season.

While owing to these and kindred conditions the year has not been as successful as would be desired, the industry faces the coming season in a healthy and vigorous condition. It realizes as it has never realized before that if Canada is to take the place in supplying the markets of the world that her premier fishery resources warrant, our fish must be so prepared for market as to favourably compare with the best from any other country, and that if our domestic demand for fresh and frozen fish is to be rapidly expanded, not only must fish in perfect condition be placed in the hands of the consumer but at moderate prices. Arrangements are being made accordingly to a greater extent than ever before.

The department has been doing much to stimulate improved methods of handling and curing fish, by investigation, and affording information, by publicity, and by obtaining needed legislation.

The compilation of the detailed statistics of the fisheries for the year 1920, which are now published in the form of a separate statistical report by the Bureau of Statistics, has not been completed at the time of writing, consequently an estimate only of the total value, and a general summary of the results of the year's operations, can be given here.

The marketed value of all fish and fish products is estimated to amount to approximately \$50,000,000. This is a decrease of about \$6,000,000 compared with the value for the preceding year. The decrease is chiefly attributable to a diminished pack of fall salmon in British Columbia, and a poor demand therefor; also to a smaller catch at lower prices of cod, haddock, and such like fish of the Atlantic coast.

ATLANTIC FISHERIES

Cod, Hake, Haddock, and Pollock.—The greater part of the catch of the four kinds named above is split, salted and dried, for consumption chiefly in foreign markets where it comes into competition with products of the same nature from Newfoundland and the United States, Norway, Great Britain, etc. As a result of the unsettled condition in which the business of the world still is since the ending of the war, and the landing of prewar supplies by the fishing fleets of Europe those markets have become temporarily blocked. Consequently, prices fell off the second half of the year especially, and many fishermen finding themselves unable to continue, gave up fishing and sought other occupations, with the result that the aggregate catch of these fish under review fell below that for the year before by approximately 1,000,000 cwt.

Mackerel, Herring, and Sardines.—The mackerel fishery was not as successfully prosecuted as in the preceding year, owing to rough weather in the early summer, and the fact that the fish did not come close to the south shore of Nova Scotia in

SESSIONAL PAPER No. 40

their usual numbers. The catch of that province, which furnishes the bulk of the total catch, fell off by about 90,000 cwts. There were decreased catches in New Brunswick and Prince Edward Island also, but the Magdalen islands' catch was substantially greater.

The herring catch of Nova Scotia was about 20,000 cwts. less, while that of New Brunswick was 180,000 cwts. greater than in the preceding year. The New Brunswick increase, however, was neutralized by a decrease in Quebec, particularly at the Magdalen islands.

The sardine fishery of the Bay of Fundy was financially a poor one. The catch was nearly as good as the preceding year's one, but the prices paid by the canners were too low for profitable operation of the weirs. This industry has not yet recovered from the slump in the demand for the canned product which took place at the close of the war.

Other Sea Fish.—The catch of halibut was about 40 per cent less than in the preceding year. The landings of swordfish, albacore, flounders, and tomcod, were considerably less also.

Shell-fish.—It is very gratifying, especially under present conditions, to be able to report that on all parts of the coast the lobster fishery, which is one of the most important of our fisheries, gave excellent results with regard to both quantity and value, so far as the fishermen were concerned at least. Some of the packers and dealers, however, were not quite so fortunate. Much of the canned product was held for higher prices than were offered at the opening of the season, but in the face of an accumulation of stocks and of falling market, sales were ultimately made at considerably less than the first prices offered.

The present regulations seem to have at last arrested the diminution of the stock of this shellfish, which would appear to be now capable of maintaining itself naturally.

About the same quantity of oysters was taken as in the preceding year. The prices were somewhat easier. The total quantity of clams taken was less. This was possibly due to the fact that fewer clams were required for bait owing to the curtailment of line-fishing operations. Quite as many clams were canned as in the preceding year.

The fishery for scallops was extended by the discovery of important beds in Digby basin and vicinity. The total catch, however, was not equal to that of the preceding year.

River Spawning Fish.—The Atlantic salmon catch fell short of that of the preceding year. The smelt fishery resulted in a decrease of 15,000 cwts. In Nova Scotia and New Brunswick, the quantity taken was less, but in Prince Edward Island it was greater. The catches of alewives and shad were not quite so good as in the preceding year.

INLAND FISHERIES

In Alberta and Saskatchewan there was a decrease in the catch of all kinds of fish. There were fewer fishermen operating and winter fishing was delayed owing to the late formation of ice on the lakes, while the lack of snow made it impossible for operators to reach the more distant points where the best winter fishing takes place. The demand for fish exceeded the supply, however, and prices were somewhat higher than in the preceding year.

There was a decreased quantity taken from the lakes of Manitoba also. Winter fishing was a month later in being started because of the mildness of the winter. High wages in lumber and mining camps drew the number of men away from the occupation of fishing.

12 GEORGE V, A. 1922

PACIFIC FISHERIES

Salmon.—The pack of salmon of all kinds throughout the province of British Columbia was about 200,000 cases less than in the preceding year. The shortage was almost entirely in the pack of the varieties known as pinks and chums. The scarcity and high prices of food supplies during the war years caused these kinds to be accepted at prices equal to those paid for sockeye in the prewar years, with the result that large quantities were packed. Since the war ended, however, it has been found difficult to market pinks and chums. Consequently, not nearly so many were packed last season. In contrast to this, it may be noted that the expensive sockeye is as much in demand as ever it was.

The pack of sockeye in the Fraser river district, while not a great one, was considerably greater than that of the year before. An important contributory cause of this and also of the unusually large number of spawning fish said to have reached the spawning beds was no doubt the limited amount of purse-seine fishing in Puget sound by American fishermen, which permitted a greater proportion of fish to escape to the river and its spawning places further up. There was a greatly increased pack of sockeye in the Rivers Inlet district. The pack of sockeye in the Skeena river district was equal to that of 1917, but very much less than that of either 1918 or 1919. In the Naas river district, the pack was disappointing, as was also that of the canneries on Vancouver island. In the latter district the canneries are dependent mostly on fall fish, and as market conditions for such were not good, the pack was much curtailed.

Halibut.—The halibut fishery which centres at Prince Rupert was successful financially during the season of 1920. For a while in the summer time a shortage of refrigerator cars temporarily interfered with fishing operations. But, taken all through, the season was a good one financially.

Herring.—The chief seat of the herring fishery of British Columbia is in Vancouver island—in the Alberni district on the west coast, and the Nanaimo district on the east coast. The fish came in great quantities during the winter season and the catch was much larger than that of the year before. The great bulk of it was salted for shipment to the Orient but owing to financial conditions in that part of the world the business, for the time being, was not so good as it otherwise would have been. An increased quantity was used in a fresh and smoked condition throughout the province.

Other Sea Fish.—Pilchards appeared in their usual abundance on the west coast of Vancouver island. Four canneries engaged in the canning of this excellent food-fish and a much greater quantity was packed.

The fishery for cod and for flat fishes was satisfactory. The demand for these fish is increasing with a healthier and steadier local market.

Whales.—The Rose harbour, Naden harbour, and Kyuquot whaling stations were in operation, and 493 whales were caught. In the preceding year the catch was 432.

GENERAL.

The weather during the first four months of the year, especially on the Atlantic coast, was stormy and cold. Fishing operations were greatly interrupted thereby and much gear was either lost or damaged. Two steam trawlers were lost entirely. Unfortunately the prosecution of the fisheries, especially in the open sea, is attended with an annual loss of life. During the year under review, I very much regret to say, there were thirty-four lives lost, twenty-four on the Atlantic and ten on the Pacific.

In conclusion it affords me pleasure to state that the officers and clerks of the Fisheries Branch performed their duties efficiently and satisfactorily during the past year.

I am, sir, your obedient servant,

A. JOHNSTON,
Deputy Minister of Marine and Fisheries.

SESSIONAL PAPER No. 40

APPENDIX I

REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, EASTERN FISHERIES
DIVISION, FOR 1920

The reorganization of the division, undertaken last year, has not yet been perfected. A fair degree of success has been obtained, notwithstanding that the full permanent staff of officers have not yet been secured. Many of the new officers have shown a most intelligent interest in their work, and give evidence of a strong desire to thoroughly acquaint themselves with every phase of the fishing industry.

New and important problems vitally affecting the industry are constantly arising, and in the nature of things the ability of the staff will be heavily taxed to successfully meet them. I am confident that within a reasonable time, by proper training and efficient oversight, that the general administration of the division will show gratifying progress.

APPOINTMENT OF TWO INSPECTORS

Vacancies in the inspectorates of two of the more important districts will necessitate the appointment of officers for these two positions. Hon. Donald Morrison, the inspector for northern New Brunswick, died in November last, after a brief illness. Mr. Morrison was an efficient inspector. Mr. R. Hockin, for nearly thirty years inspector for eastern Nova Scotia, is to be retired on the appointment of a suitable person to succeed him. Mr. Hockin was one of the most experienced officers in the division; wise in counsel and cautious in decision. These two vacancies add to the difficulty of successful supervision.

GENERAL CONDITION OF THE INDUSTRY DURING 1920

In the report for 1919 reference was made to the abnormal conditions affecting the industry in consequence of the unexpected ending of the great war. The dealers were caught with heavy stocks on hand which, owing to the extraordinary world conditions, practically financial, could not be readily marketed, even at greatly reduced prices. In addition, the cost of supplies and the high operating expenses continued, forcing the dealers and manufacturers to greatly curtail operations, with the result that the volume of fresh and manufactured fish declined. These conditions resulted in greatly curtailing the operations of the shore fishermen. In some localities the catches did not bring returns sufficient to pay operating expenses and afford a means of livelihood, resulting in a considerable number of the fishermen engaging in other operations. The lobster fishery was practically the only principal fishery that continued highly remunerative to the fishermen.

The dealers were more heavily hit than were the fishermen, as the heavy stocks on hand were difficult to profitably dispose of owing to depressed markets. In other words, the dealers were in the unfavourable condition of being heavily stocked with the goods of the previous year, and therefore unable to encourage large catches for 1920.

The past year has therefore been the most trying for many years, notwithstanding that the total catches and values greatly exceed the catches and value of the normal year preceding the great war, when the total marketed value of the fisheries of this division was \$13,886,780. This total increased during 1915, 1916,

12 GEORGE V, A. 1922

and 1917 to over twenty-two and one-quarter million dollars. It will be interesting to note that last year the total marketed value for western Nova Scotia alone amounted to approximately \$5,982,367.

The catch of the Lunenburg fleet will show a shortage in value of considerably more than \$1,000,000 as compared with the previous year, notwithstanding that the catch was only about 4,000 quintals less.

The catch last year was 295,150 quintals, and the number of vessels in the fleet was 105, and therefore the average catch was 2,810 quintals per vessel for the season. This year with 117 vessels in the fleet and a catch of 291,475 quintals, the average is 2,488 quintals.

Last year the fishermen received \$14 per quintal for their first trips, and \$12 for their second and third trips, whereas this year the fish brought \$12.50 early in the spring, later dropping to \$9.25, while the summer catch sold as low as \$8.25, with large quantities remaining on hand.

With the present high cost of outfits, labour, etc., and if the fish bring only \$8.25 per quintal or less, a large number of the vessels will have operated at a loss. This also has affected the shipbuilding industry to such an extent that practically every shipyard in Lunenburg county and along the south shore engaged in building fishing vessels has been closed down, and the workmen are now going elsewhere to seek employment.

While for the four years, 1915-18, there were substantial increases in the catches of the principal varieties of food-fish, the increase in the marketed value of the catches was due almost wholly to conditions brought about by the war. Food became a world need of grave concern, and the fisheries were looked to to take the place of meats and other supplies required for the vast forces of the allied armies. Cost was of minor importance, and therefore every inducement was given to produce and manufacture fish-food products, with the result that there was a great and increasing rise in prices consequent to the increasing demand and increasing cost of operations.

The past year has been largely a year of readjustment to normal conditions, and the difficulties of the situation have been greatly aggravated by the large volume of goods which it has been difficult to dispose of at any price.

THE LOBSTER FISHERY

The lobster was the only leading fishery that was prosecuted with uniform success during the year. Indeed, it was the outstanding fishery. The weather was favourable and the catch and pack greatly in excess of the previous year. The fishermen were particularly fortunate, as high prices prevailed, and, consequently, the financial returns were large. The total number of licensed fishermen was 12,226; Nova Scotia having 8,253, New Brunswick, 2,099 and Prince Edward Island, 1,874.

The prices paid by the dealers in live lobsters for the export trade reached as high as 40 cents per pound, while the prices secured by the fishermen for the small lobsters for canning purposes constituted a record. In some districts 18 cents was paid, or 4 cents more than any previous year. Altogether the season was the most profitable to the fishermen in the history of the industry. The total catch was 399,299 cwts., as compared with 345,806 cwts. the previous year.

There was, however, a sharp drop in the prices secured for the canned product. For several years previous sales were made at from \$45 to \$48 per case. In the early season of 1920 the offers were below \$40 per case. Some of the packers and dealers were, however, expecting a repetition of the high prices of the previous year, and therefore large stocks accumulated, and when the prices continued to drop many of the packers were caught with large supplies on hand, and ultimately had to accept offers at less than \$30 per case, and in some instances as low as \$25 per case. The loss at these low prices was serious as they were insufficient to pay the cost of the pack.

SESSIONAL PAPER No. 40

An interesting phase of this fishery was the increase in the catch of medium and large sized lobsters during the past two seasons, as compared with the two previous years. For some time the portion of lobsters of nine inches in length and over, as compared with the catch of small lobsters, was a matter of grave concern, as it appeared that in a few years the fishery would become so depleted that drastic action would have to be taken to preserve it as a commercial industry. This was especially true of the conditions existing in western Nova Scotia and portions of the Prince Edward Island coast. The increase in the proportion of large lobsters, particularly in the prolific district of western Nova Scotia, is attributed to the shortening of the fishing season to three months each year instead of five and a half months as formerly. Whatever may be the cause in this respect it is quite apparent that the fishery has been greatly improved the past several years. The total catches during the shorter season have been almost equal to the total catches taken when the longer fishing season prevailed, and it would appear that the danger of depletion has been overcome, and that the equilibrium between the yearly increase and the yearly catch may be maintained for many years.

There was a serious falling-off in the total catches of the other principal varieties of commercial fishes such as cod, haddock, pollock, herring and mackerel, due almost wholly to the fact that the returns to the fishermen were insufficient for profitable employment. The decrease of the mackerel catch was over 87,000 cwts. as compared with the previous year. Nova Scotia suffered most severely, as the catch for 1919 was about 162,000 cwts., while last year it dropped to 81,000 cwts. The falling-off was due to the abnormal weather conditions prevailing during the month of May, preventing the fish from approaching the shore or schooling near the surface.

SPECIFIC CONDITIONS

Prince Edward Island.—General operations were curtailed owing to the low prices, and many of the fishermen were compelled to engage in other operations.

Fine weather prevailed throughout the lobster fishing season from April 1, and resulted in large catches and increased pack. The total pack was 40,322 cases, as compared with 31,911 cases the previous year.

There was a slight increase in the catch of herring, but a decrease in the value. The smelt fishery was very satisfactory, showing an increase in catch and value. Other fisheries decreased in catch and value, particularly cod, hake and mackerel, the latter being the most serious.

While there was a decrease of over five hundred barrels in the catch of oysters, the sizes and quality was much improved. The prospect for increased catches from the areas in East and West rivers, and Vernon, Seal and Orwell rivers, are good, as the beds are in better condition than for some years. It is to be regretted that the blight, which has been affecting the areas of Richmond bay, continues. The beds in Hill river, Mill river and Lot 6 river are suffering apparently from the same blight, the entire catch of last year being destroyed.

New Brunswick.—With the exception of the lobster fishery, the operations of the past year were unprofitable to all engaged in the industry. Fish of all kinds were plentiful, and large catches taken by those who continued operations, but, unfortunately, the market conditions drove many of the fishermen out of the business.

In the Grand Manan district the line fisheries were abandoned. Buyers were hit heavily, as the markets were constantly falling, and the dealers were left in nearly all instances with large stocks on hand which were difficult to dispose of at any price.

The sardine fishery was financially disastrous to the fishermen. The run of fish was good, but the small prices paid by the cannery operators made profitable operations

12 GEORGE V, A. 1922

impossible. The season opened with prices of \$10 per hogshead, dropping within a few weeks to \$5 per hogshead. When it is remembered that two seasons previously the price ranged as high as \$70 per hogshead, it can easily be realized that a drop to \$5 was most disappointing. With a good run of herring a fair profit may be made at \$10 per hogshead, but it would be difficult, even under most favourable conditions, for the fishermen to pay operating expenses at \$5 per hogshead. Until the sardine markets regain their former buoyancy the present unsatisfactory condition of the fishery will continue.

The smoked-herring industry also suffered severely. This business is carried on extensively in the Grand Manan district, where a large amount of capital is invested, which in past years has made generous returns to both fishermen and operators. A record pack of smoked herring was put up, and the prospects were for a prosperous year but the prices dropped to the lowest level for many years. Some 300,000 boxes of smoked herring of the finest quality are in stock with no market in sight.

The lobster fishery was the one bright spot. A greatly increased catch was made, high prices prevailed, and consequently this fishery was most satisfactory. As an insight into the eagerness with which the fishermen engaged in this industry, it might be stated that one fisherman, fishing alone and operating 70 traps, sold nearly \$500 worth of lobsters in two weeks.

In the northern district lobster packing is extensively carried on, while in the Charlotte-St. John district there are no canneries, the catch being shipped alive chiefly to the United States markets.

Nova Scotia West.—The district comprising the seven western counties suffered to a less extent from prevailing unfavourable conditions than any other section of the Atlantic coast. There was a noticeable decrease in the catch of cod, haddock, pollock, and mackerel. The lobster fishermen had the best and most prosperous year in the history of the industry.

It should be pointed out, as showing the importance of the lobster fishery in western Nova Scotia, that 40 cannery licenses were issued and nearly 4,000 fishermen's licenses; 2,157 boats were engaged and 3,908 fishermen employed. The total number of traps operated was 280,000, having a valuation of \$482,000.

Eastern Nova Scotia, comprising the remaining counties of the mainland, experienced difficulties that taxed the ability of the dealers, and greatly embarrassed the fishermen, as the low prices secured by the boat fishermen, and the reluctance of the dealers to add to the stocks, resulted in curtailed operations. The steam trawlers with their heavy overhead expenses had to be kept in commission. While large catches were taken by the trawlers, it was found impossible to market the catches with any degree of profit. Indeed, in several instances, the losses were very heavy, particularly of catches landed at American ports. Two landings, one of 400,000 pounds arrived in bad condition owing to warm weather and had to be sacrificed, entailing large losses.

As in other districts already referred to the lobster fishery was productive and valuable.

Cape Breton Island.—This district did not escape the general prevailing conditions along the whole coast. Indeed, the past year was the most unprofitable yet experienced. Owing to the low prices for the catches fishing operations were largely suspended for a considerable portion of the year.

As in the other districts already noted the lobster fishing was carried on with gratifying success. The fish were plentiful, the weather uniformly fine and the prices exceptionally high, resulting in an increase in the catch and in the value of the catch. Six additional lobster canneries were established during the year, i.e., at Main-a-Dieu, Long Point, Eastern Harbour, Ingonish, Inverness and Fouchu.

SESSIONAL PAPER No. 40

There was a decrease in the catch of cod with a decrease in value. Hawkesbury is the only port showing an increased catch, and this was due to the addition of one steam trawler to the fleet.

The decrease in the catch of haddock was large. Ingonish was the chief sufferer in this respect. Hawkesbury showed an increase. No catches of halibut were taken at Glace Bay or at Scatarie, while the catch at Port Hood and Port Hawkesbury was less than one-third the preceding year. Swordfish fishing was prosecuted with quite satisfactory success at Scatarie, Little Lorraine and Louisburg.

RIVERS AND INLAND FISHERIES

The rivers, streams and lakes of the Atlantic coast provinces constitute an amazing network of waters, nearly all of which are frequented by valuable anadromous commercial food-fishes such as smelt, gaspereau, bass, whitefish, sturgeon, and salmon. New Brunswick leads in the abundance of the varieties named.

The commercial salmon fishery produced a decreased catch as compared with 1919, the conditions being particularly unsatisfactory in the St. John river and tributaries and along the coast of Cape Breton, where the catch was almost negligible.

Sport fishing, particularly for salmon and trout, attracts many thousands of travellers and sportsmen to our rivers each year and constitutes a very valuable source of immediate income and employment. From a sport fishing point of view alone any reasonable expenditure for the conservation, protection and expansion of the river fisheries is justified.

But the value of the river fisheries is very much greater than from the sport fishing viewpoint alone. The valuable commercial fisheries such as smelt, gaspereau, salmon, etc., already alluded to, are wholly dependent on the condition of the river fisheries. These fish must have access to the rivers and lakes for spawning, and unless free access and protection is offered during the spawning seasons, both sport and commercial fisheries, so far as the anadromous varieties are concerned, will speedily be destroyed. And in addition the "off-shore" deep-sea fisheries will be affected by any depletion of the annual runs of the anadromous fishes, as the deep-sea fishes, which are caught in great abundance near the shores, are attracted shorewards by the feeding provided by the runs of the fish to the rivers for spawning.

In view of the above it should be apparent that the protection of the rivers and lakes is vital to the success of both the river and shore fisheries.

The demand for protection is growing from year to year. Many of the best and most prolific salmon and trout rivers have been almost destroyed by illegal fishing methods, and the agitation for more adequate protection is becoming increasingly insistent. Owing to the multitude and magnitude of the inland waterways it is physically impossible, except at most unreasonable cost, to give all the protection called for, but it should be possible and financially feasible to give a satisfactory degree of protection to the principal rivers and streams.

In New Brunswick such important rivers from a commercial and sport fishing point of view is the Restigouche, Miramichi, St. John, and the more important tributaries should have every possible protection. In Nova Scotia the Margaree, the Mira, Musquodoboit, Sheet Harbour, St. Marys, La Have, Medway, Mersey, Tusket and the Bear rivers are among the principal streams that should have every consideration. It is, however, quite impossible for the sixty-five or seventy officers employed for the whole of the Atlantic Coast Division to afford the protection desired, as their time is quite fully occupied in the multitude of duties in connection with the coast and deep-sea fisheries, and the supervision of the fishing generally. The appointment of special guardians is essential, and the perfecting of this service is

12 GEORGE V, A. 1922

in hand. Emphasis should not be laid on a cheap service, but rather on providing adequate protection. The total number of officers for the whole Eastern Division is hardly a sufficient force for New Brunswick alone.

It must be realized, however, that the vast extent of the rivers and inland waters, when the sparse portion along these waters is considered, should not call for the elaborate protection essential to adequately supervise the whole system of waterways, but every effort should be made to safeguard the fisheries of the principal rivers and streams and to insure the prosperity of the fisheries affected.

TECHNICAL EDUCATION

With reference to that portion of the report of last year dealing with the technical education of the fishermen, it may be said that after consultation with Professor Sexton, of the Halifax Technical College, who has the matter in hand, that it was not found feasible to attempt any direct work last year, as it is quite essential that much preparation was required in order to ensure the success of the movement. It is probable, however, that the preparation will be completed the coming summer, and several of the courses instituted before the end of the year.

The conference of the fishery officers of the division was held at Truro in the latter part of September, continuing for five days. The special features were covered by a syllabus prepared by the Biological Board on—

- (1) "Fish and their Environment."
- (2) "Migration of Fishes."
- (3) "Types of Gear."

The conference was of highest importance and carried on with signal success. It is a pleasure to report that a better appreciation of the character of the work and the fishery officers is already apparent. Administration and supervision was found to include more than the routine of duties incident to the enforcement of regulations and preparation of official reports. The fishery officers are no longer to consider the enforcement of the laws as the chief end of their endeavours. This attitude in the past has too often resulted in antagonisms and dissatisfaction. Under the higher conception of the duties of the positions the officers are being impressed with the fact that they are to assist and encourage the fishermen, and by careful study to be able to consult and advise the fishermen and dealers in all matters affecting the industry. The continued technical education of the officers is therefore essential, with the prospect that within a few years they may become experts in the fisheries in their respective districts. The conference for 1921 will be held at Charlottetown, P.E.I.

TECHNICAL INVESTIGATIONS

Special interest has been taken the past year in endeavouring to ascertain the primary causes of discoloration in canned lobsters. As it would appear that careless or imperfect processing methods were largely responsible, greater stress is being placed on the processes from the time the lobsters are taken alive from the waters until the canned product is ready for the market. Circulars to be placed in the hands of the canning operators are being prepared, and it is expected that careful compliance with the suggestions and instructions given will largely prevent any discoloration of the meat.

(2) Also, investigations are being hastened in the matter of the red discoloration occurring at times in dried fish, resulting in some instances of serious loss. A number of samples of affected dried fish have been forwarded to the Biological Department of the McDonald College, Montreal, for examination.

SESSIONAL PAPER No. 40

SCALLOP FISHERY

As the former scallop fishery of Mahone bay, Lunenburg county, N.S., had been showing signs of exhaustion the past several years, action was taken to protect the fishery by the adoption of a regulation shortening the fishing season to a period from December 15 to January 20. Quite satisfactory catches, however, were made last year, each of the smaller boats engaged averaging about seven gallons, shelled, per day's fishing.

From information at hand it appeared probable that a scallop fishery might be developed in other portions of the coast. The fishery officers were therefore instructed to investigate the possibilities in their districts, with a result that it is apparent that a valuable fishery may be developed, as the fish are found to exist in considerable quantities at many points along the coast, including the Miminegash and Cape North districts of Prince Edward Island, Antigonish, Cumberland, Annapolis and Digby counties, N.S., and the Main-a-Dieu district, Cape Breton. Also, as in Quoddy bay, N.B.

The best and most immediate prospect, however, was discovered in Digby basin and the adjacent waters of the bay of Fundy, where there was found to exist large and valuable areas, and instant attention was given to the development of the fishery, which has been successfully conducted the past year. The catches are large, and will doubtless result in the development of remunerative industry.

Investigation should be continued to ascertain the extent and importance of the areas already discovered, and particularly in the Nova Scotia Bay of Fundy district.

TUNA FISHERY

The development of the tuna, or albacore, fishery is interesting. Considerable numbers of this species of large fish have been frequenting the coast for some years, but until quite recently they were looked upon as a nuisance by the fishermen, and when taken incidentally were utilized for the manufacture of farm-land compost, as they were not looked upon as a desirable food-fish.

Some ten or twelve years ago, however, a market was found in the United States, chiefly in Boston and New York, and considerable shipments were made each year from Clark's Harbour district of Shelburne county, realizing about 3 cents per pound. The market has been steadily increasing and shipments made this year were disposed of at 9 cents per pound.

No special effort, however, was made for capturing the fish until three years ago, when the several enterprising fishermen of Hubbards utilized a double-headed mackerel trap-net, which was operated off Hubbards during the tuna run. Catches were readily and profitably marketed in Boston at good prices, and in the last two years particular attention has been paid to the fishery.

The value of the tuna as a food-fish will compare favourably with any of the large fishes, the steak portions not being unlike a good quality of beef. Indeed, it is difficult to discern properly prepared chipped tuna steak from chipped beef. The flesh is held in high esteem by the Italian and Portuguese residents of Boston and New York and a good trade in the canned product could easily be secured for a large pack, particularly if put up in oil.

Canned tuna has already taken a good position in the retail trade. The chief difficulty in establishing a canned tuna industry is that the supply cannot be relied upon. A school may strike in at any time during July and August and not be followed by any other schools for several weeks. It is quite possible, however, with proper facilities, to preserve the catches in good condition for canning for several weeks, and thus provide sufficient supplies to stabilize the operation of a cannery during the season.

12 GEORGE V. A. 1922

There is little or no retail trade in tuna in the Maritime Provinces, for, as already noted, its value as a food-fish has not yet become recognized.

Early in September, about the close of the run, Messrs. Bach and Finn, the official photographers of the Department of Trade and Commerce, succeeded in getting a complete series of "shots" covering the fishery at Hubbards. The whole intensely interesting operation of "playing" the big fish in the spiller, killing and landing them, was most successfully secured. These pictures are, without a doubt, the only views of the kind existing, and will doubtless awaken much interest when they are shown on the screens throughout the country.

It should be said that a considerable number was taken in the trap-nets at Port La Tour, Shelburne county, in September, over one hundred being captured in one day.

MACKEREL CRUISING EXPERIMENTS

Among the interesting developments during the past year were the mackerel cruising experiments. The purpose of the mackerel cruising experiments was to locate the spring schools, and three of the fishery protection cruisers, the *Hochelaga*, the *Arras*, and the *Arlaur*, with wireless equipment, were stationed off cape Sable early in May to watch for the approach of the mackerel schools.

Complete arrangements were made for the transmission of information to the radio stations, and its instant despatch to the telegraph operators at the principal points along the coast, and from these points to be communicated by telephone to the fishery settlements and stations. The whole south shore coast from Yarmouth to Canso was thus kept advised of the movements of the fish and the apparent volume of the movement.

THE FISHING SCHOONER RACE

Among the events of outstanding interest was the ocean race off Halifax between the Lunenburg fishing schooner *Delawana* commanded by Captain Thomas Himmelman one of the successful "killers" of the Grand Banks fleet, and the Gloucester fishing schooner *Esperanto*, commanded by Captain Marty Welch, a native of Digby county, N.S. The arrangements were in the hands of a competent committee of business men, and the publicity given the event aroused international interest, especially among the fishing fleets of the Canadian and American Atlantic coasts. The prizes were \$4,000 for the winner and \$1,000 for the loser. The race is expected to be an annual one.

PATROL BOATS

The patrol boats are continuing to perform essential service along the coast. While they are chiefly used for the prevention of illegal lobster fishing, their services are frequently required to assist the shore officers.

The *D* and the *Nelson* operated in Prince Edward Island, the *A*, *B*, *C*, *E* and *F* in Nova Scotia, and the *G*, *Phalarope*, *Hudson* and *Mildred McColl* in New Brunswick.

The *Seagull* has been taken out of the service, as the condition of her hull did not warrant the expense necessary to put her in good condition. She will be disposed of and not replaced. The *Hudson* was also laid up for similar reasons and will be disposed of. She was replaced by the *Mildred McColl*. One of the western Nova Scotia boats will be assigned to assist the *Mildred McColl* in the patrol of the large and important lobster fishing coast from Northumberland straits to Bay Chaleur. Other changes are in contemplation with a view to perfecting the service and reducing the operating costs.

The service rendered by the boats is of most valuable character, and cannot possibly be performed by any other means. The results accomplished since the inauguration of the service in preventing widespread illegal lobster fishing has been due very largely to the work of these boats.

SESSIONAL PAPER No. 40

THE FISHERIES OUTLOOK FOR 1921.

A decline in the cost of fishing supplies and outfits is already taking place, and with this decline the fishermen will be more advantageously situated than during the past year, and therefore it is quite probable that the industry will be prosecuted with greater energy. Further, it may be taken for granted that the prices for the catches, with the possible exceptions of small lobsters for cannery purposes, will continue at least on a par with the prices prevailing the past year. Indeed with the resumption of operations by the dealers there is every reason to believe that the fishermen will receive higher prices for their fresh catches.

It must not be overlooked, however, that the trade has important problems to solve before any sound basis is secured for a permanent and successful business.

The fresh fish trade is comparatively small, and the prospects are that it will continue in this unsatisfactory condition unless methods are devised to take advantage of the markets. The Canadian is restricted to a few centres of population. The hazard of the trade, with distant centres such as Montreal and Toronto are not appreciated by the average consumer, and, indeed, owing to the nature of the trade, which demands that fresh fish shall reach the consumer at the earliest possible moment after being taken from the water, it has been difficult to very greatly increase the Canadian consumption of fresh fish.

In any consideration of the expansion of the industry the export trade must not be overlooked. The statement that there has been only a very inconsiderable increase in the catch during the past twenty-five or more years is quite true, and this lack of expansion must continue unless the export trade is increased. The Canadian market is limited. Our population is small, and the centres of population too remote for any appreciable extension of business. The expansion of the Canadian market must in the nature of the case depend largely on the increase in population.

It should be quite evident that the export trade is the key to a big trade door, and there is no sound reason why the fisheries of the Atlantic coast should not very greatly develop, and the industry profit, from the markets of the world.

REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA FISHERIES OF QUEBEC, FOR 1920.

The statistics, which I have already forwarded to the department, compared with those of last year, tend to show a considerable decrease in the fisheries of the Gulf Division both in value and quantities.

After my departure from Quebec, on the 10th of June, on board the *Loos*, about five weeks later than usual, with a view to undertaking the supervision work in the gulf, I visited the different sections of the district: North shore, Magdalen islands, Canadian Labrador, counties of Gaspé and Bonaventure, for the purpose of distributing as soon as possible the fishing bounties and licenses, of disposing of a number of complaints on the part of fishermen, and of making myself acquainted with the fishing operations carried out since the beginning of spring.

I observed profound uneasiness existing among the fishing population on account of the excessive prices of all commodities of first necessity, of the low value and scarcity of cod and salmon, of the loss of time caused by the presence of large schools of porpoises on the coast of the county of Saguenay, as well as of the high wages offered fishermen in the different lumbering enterprises in the interests of which there was a great demand for manual labour. At the beginning of the season it was easy

12 GEORGE V, A. 1922

to foresee what the final results would be. The two most important counties, those of Gaspé and Saguenay, excepting Magdalen islands, did not yield half the value of the preceding year. On the other hand at the Magdalen islands, owing to the abundance of mackerel and to extensive preparations made in the course of winter for lobster fishing, the result was equivalent to that of the season of 1919. A large decrease is also noted in the yield of the fisheries for Rimouski and Bonaventure.

At the end of June a large number of fishermen had already begun to move to small industrial centres and to cities for the purpose of looking for more lucrative employment; giving up, with the evident intention of not taking it up again, that trade to which they had devoted the occupations of their whole life. The wave of depression now sweeping over all our fishing villages, under the influence of causes which do not seem to be disappearing is such as to give birth to a sentiment of grave uneasiness for the future of the industry in that part of the country.

COD

This fishery, the most important of the Gulf Division, has been a failure; certain sections were particularly affected. On the north shore the migrations of porpoises in schools of thousands have caused considerable losses, and should their appearance in the gulf continue to occur from year to year, it becomes evident that they will drive away from that coast a good portion of the population. The capture of those animals, practised on a high scale, would be a source of benefit, but as it requires improved and expensive apparatus, it cannot be expected that local enterprise will take it up. They are much more noxious than dogfish and certain newspapers have even thought that the public powers should intervene and help to exterminate them in the same way as it is done on the coasts of France, where suitable vessels and boats have been fitted out for that purpose at the Government's expense.

In the Canadian Labrador cod-fishing is usually very active during the months of June and July. It was nearly a complete failure this year in the course of those two months on account of the jamming of ice, the absence of eaplin and the prevalence of easterly winds. In the western part the results were disastrous for most fishermen; many have not even derived a sufficient amount of revenue to defray the dues on their trap-net licenses. In the eastern part those who have persisted in waiting for more favourable conditions, succeeded in making, in the first part of August, catches corresponding in quantities to the average of the past year.

At the Magdalen islands, owing to the low prices offered, fishermen neglected cod fishing and engaged in some more remunerative kind of fishery.

On the coasts of Gaspé and Bonaventure, cod has given the poorest yield ever recorded. The few fishermen who had not given way to the discouragement over the failure of their operations during the first months, got nothing but small quantities of fish at the end of the season.

SALMON

This fishery, which has been constantly declining these last years has suffered a further decrease. Several license holders did not even deem it advisable to set their nets and removed them after a few days of operations. This peculiar circumstance forms a topic of conversation among the interested who endeavour to explain the falling off by various views of natural history principals. If it is true that salmon have a tendency to come back to their breeding grounds or grounds already frequented by them after more or less long periods of absence without anyone being able to determine the temporary causes which incite them to act in this way, it would seem that there are, in the river and gulf of St. Lawrence, causes of a permanent character to explain their gradual disappearance from year to year. It is reasonable to believe that when

SESSIONAL PAPER No. 40

they had access to all the rivers flowing into the St. Lawrence river, and as far as lake Ontario, to spawn at liberty, they could reproduce themselves with more facility and consequently assemble there in larger quantities.

But it is a well-established fact that nowadays salmon have ceased frequenting quite a number of rivers formerly very much appreciated by sportsmen. West of the mouth of Saguenay they have practically disappeared. Even east of the Saguenay we have observed, these last years, several other streams entirely depleted of fish or on the verge of being so, either for lack of supervision or for having been spoiled by sawdust, mill refuse, etc., or for lack of suitable fishways. Among other rivers, I may mention the following: Bergeronnes, Escoumains, Bersimis, Bec-séie, Rimouski, Matane, Cap Chat, Sainte-Anne-des-Monts, and Mont-Louis, which not long ago were frequented by an important number of anglers, and which are now considered as of little value. By devoting to those rivers particular attention, they would not perhaps recover their old prosperity, but they could at least be partially restored.

As the lumbering industry rapidly develops in the Gulf Division and has a tendency of extending eastward as far as the shores of all the rivers where it is possible to obtain lumber it consequently threatens those rivers with the same fate as other streams situated further west. As there will likely be soon a complete reorganization of the fisheries service throughout the district, it is my duty, I think, to draw, in a particular way the attention of the Department to the present conditions of our rivers. I am convinced that the decrease of salmon in the tidal waters is due to some explainable causes, and that their conservation for sport and trade purposes deserve, more than ever, serious attention and should be secured by the application of new protective measures.

The rivers of the counties of Gaspé and Bonaventure are generally more prosperous than those on the North Shore and those flowing into the St. Lawrence river.

LOBSTERS

The high prices paid in 1919 had encouraged both fishermen and canners to undertake more extensive preparations for the season of 1920. Owing to this increased activity, to the abundance of bait, and to favourable weather it is noted that this fishery has given a yield greater than that of the preceding year.

Expecting the county of Bonaventure, where there is practically no fishery overseer for its supervision, the regulations regarding lobster fishing were faithfully observed. Four legal proceedings were taken at the Magdalen Islands, but they related to offences committed in 1918.

MACKEREL

The mackerel fishery which is chiefly carried on at the Magdalen Islands, shows an appreciable increase compared with the catch of last year. Mackerel have a tendency to come back in increasing quantities into Baie-des-Chaleurs, a fishing area which had been deserted by them for some years. The fishermen of that locality are not equipped however for the carrying on of this fishery in a paying way, and little attention is given to it.

At the Magdalen islands, owing to the little care given to the handling and preparation of this fish for the market, the benefits derived from its industry are far from what we could reasonably expect. The rigorous application of the new regulations concerning the inspection of fish products which become effective in 1921 would tend, it seems to me, to remedy that abnormal state of things. If our fishermen were perfectly acquainted with the most suitable methods to prepare that fish as well as with the benefits to be derived by offering for sale a first-class product there seems to be no reason why our products should be inferior, as a food, to similar articles procured elsewhere.

12 GEORGE V, A. 1922

HERRING

Fall herring which could be obtained in nearly unlimited quantities in the eastern part of the Canadian Labrador seem to gradually come back to the fishing grounds from which they had disappeared for about thirty years. According to the fishermen of the neighbourhood of Bradore bay thousands of barrels could have been salted if they had had at their disposal the necessary apparatus to capture and prepare that fish.

At the Magdalen islands herring appeared in large quantities at the end of April and remained in Pleasant bay and around the islands until the month of June. As the fishing vessels in the habit of calling for bait were not numerous in the spring, several fishermen could not find any buyer for their catches, and were not slow to put an end to their fishing operations. For some years herring smoking has been regularly carried on in that locality, and the product has been easily and advantageously sold.

In the counties of Gaspé, Bonaventure and Rimouski, herring was rather scarce.

The conclusions to be deducted from the above observations may be summed up by stating that in the Gulf Division, excepting the Magdalen islands, the fishing industry which was rather backward many years before the war and which had regained a little activity during the period extending from 1914 to 1919, has fallen again into a lamentable condition. Cod-fishing, indisputably the nucleus of the industry, is particularly affected by different causes against which our fish dealers and fishermen are not prepared to struggle. The latter always entangled in their old methods and processes, improperly equipped and only practicing their trade as a last resource till they can find less trying and more lucrative occupations, are moving in a body to some other fields of activity. This is rendered easy on account of the fact that numerous new industries have been established in the district, in which they are sure to find employment.

By taking into account the number of fishermen having thus given up their trade, and of those intending to follow the example of the former, since they are offering for sale at a low price their fishing tackle, apparatus and boats, not more than 50 per cent of the number of fishermen for 1919, will remain for the 1921 season's operations.

The patrol season on board the *Loos* closed without any accident. Foreign fishermen while not appearing in large numbers on the coast of Labrador and the Magdalen islands, complied with all the local regulations.

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE FISHERIES
DIVISION, FOR 1920

In consequence of the reorganization of the service which went into effect on April 1, my office was moved from Indian Head, Sask. to Winnipeg, and the province of Manitoba was added to the districts under my administration. Judging from the results of the reorganization from April to the present date, it promises success along the lines for which it was made. As in all new systems, certain difficulties have from time to time arisen, but these have adjusted themselves to a very great extent, and under the conditions now obtaining everything is working smoothly and gives every promise of increased efficiency. In a few districts, where no overseer has been employed, owing to the previously employed overseer resigning, the situation has been met by placing a special fishery guardian to act until a permanent appointment of an overseer has been made. There appears to be a lack of men qualified for the position

SESSIONAL PAPER No. 40

of overseer, or who can qualify by passing the necessary examination. In all cases where special fishery guardians have been appointed returned soldiers have been given the preference.

In all three provinces there is a decrease in the catch. The past year has been most unfavourable for fishing operations. A very late spring shortened the fishing greatly at that season, a late fall delayed the formation of the ice on which operations are conducted in the winter until well into December, lack of snow made it impossible to reach the more distant points at which the most of the winter fishing is carried on, and a mild winter has reduced the operations, as it was not possible to be certain that the catch would keep in good condition, thereby limiting the catch.

On taking over the province of Manitoba I found that the regulations were not as well known or observed as could be wished and considerable difficulty was experienced in making it plain to the fishermen and some of the fish dealers that such a condition could not be allowed to continue. During the last three months a great improvement has been observed in this connection, it is simply a matter of treating the whole situation with firmness, and at the same time with justice and broad mindedness. I have every hope that in the near future I will have the co-operation of all fishermen in enforcing the regulations. I can say that I have had the fullest co-operation from all the larger companies conducting operations in the province and have found them willing to assist me in every way.

Inspector D. F. Reid died on September 2, after a lengthy illness, having been in the service of the department for a number of years. The vacancy made by his death has been filled temporarily by his son, Mr. C. F. Reid, who has given most acceptable service.

During the past year the sturgeon fisheries in the northern part of the province of Manitoba were opened to commercial fishing. It is, however, too early to give any definite opinion as to what may be expected of these fisheries; the catch not having as yet been brought out. Owing to lack of snow it was impossible for the fishermen to reach the fisheries until very late, so that no real estimate of their worth can be made at present.

The steamer *Bradbury* was employed on her usual work, placing buoys in lake Winnipeg, lighthouse work and taking care of the spawn at the different hatcheries, the late fall made it impossible for her to complete her work until much later than usual.

It is expected that in Alberta fishing for commercial purposes will be started at lake Athabasca during the coming summer. A cannery site has been procured by the Mackenzie Basin Fisheries, Limited, of Calgary, and I am informed that it is their intention to operate this year. This, however, depends entirely upon the question of transportation, which at present is very poor.

REPORT OF CHIEF INSPECTOR, LIEUT.-COL. F. H. CUNNINGHAM, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR 1920

The fishing season of 1920 was ushered in facing the entirely new policy of open fishing.

For many years there has been a restriction in the number of licenses which should be issued. This was one form of conservation by preventing intensive fishing in any one area. The number of applicants for fishing licenses had so increased that a change of policy became necessary, and to give every British subject an opportunity of entering the fishing business if he so desired, the restricted license policy was cancelled and the new policy of granting unlimited licenses to all British subjects of the white race and Indians took its place.

12 GEORGE V, A. 1922

For the purpose of seining licenses, the province was divided into twenty-one seining areas, for which a license was granted to fish in any portion of any one area. In the areas restricted to gill-net fishing, unlimited licenses were issued to the white race and Indians, and the number of licenses to be issued to other than the white race was restricted to the number operating during the season of 1919. This change in policy has practically eliminated all grounds for complaint that favouritism was shown in the issuing of licenses, and the new system appears to have met with the public approval.

With the advent of open fishing, it became necessary to look for some additional adequate conservation methods, and this was reached by placing fishing boundaries at the mouths of rivers inside of which no fishing was allowed, and further, the weekly close season was extended where conditions demanded, and in addition thereto, all fishing was stopped for the season on a given date in those areas where it was necessary to provide for an adequate supply of parent salmon on the spawning grounds.

Unfortunately, the market conditions for fall salmon were so limited that the pack of this commodity was greatly curtailed, and the total pack for 1920 of all species is 1,187,616 cases as compared with 1,393,156 cases for the season of 1919.

At the moment there is practically no demand for the fall varieties, and such demand as may exist is at prices which are below the cost of production. It is quite obvious that, to compete successfully in the markets of to-day, the cost of production must be largely reduced. One of the greatest competitors for the world's markets is the United States, where the raw material is produced much more economically than in Canada, under our regulations, which no doubt are more effective from a standpoint of conservation, but from the standpoint of competition are much more expensive.

A retrospect of the past fishing season is satisfactory so far as the run of fish to the various spawning grounds is concerned. The pack of 44,598 cases of sockeye for the Fraser river district is most encouraging, and in addition to this evidence comes in from all quarters that the spawning beds have been exceedingly well seeded. In fact, it is stated by J. P. Babcock, Esq., who has made a special study of the spawning grounds of the upper Fraser, that in no year since his knowledge of the Birkenhead river has he seen so many spawning sockeyes on the beds. This is most encouraging and satisfactory and tends to the optimistic views of many that the Fraser river will again come back to its former productiveness.

Of course, it must not be overlooked that fishing operations in Puget sound were limited; there being very few purse-seines operating in that area, and if the Puget sound operators are honest in their desire to assist in the building up of this river, restricted fishing must be practised by them for several years. Whilst south of the border, traps and purse-seines are allowed, nearly 500 purse-seines operating in 1917 --in addition to nearly 200 traps, no sockeye are caught on the Canadian side of the line except by gill-nets, apart from six traps on the southwest shore of Vancouver island opposite to the American waters.

It is pleasing to refer to the large pack of sockeye at Rivers Inlet. One hundred and twenty-one thousand two hundred and fifty-four cases were packed, and a large number of fish were exported to canneries outside the Rivers Inlet area. This pack comes well up to the big one of 1915, when 130,000 cases resulted from the season's operations.

The one disappointing area in District No. 2 is the Naas river, where only 16,740 cases were put up, as compared with the normal pack of some 30,000 cases. It is maintained by the operators and fishermen that the American traps, operated in American waters, are taking sockeye headed for the Naas river and are thus depleting the run. This phase of the question is receiving the attention of the authorities both at Ottawa and Washington, and it is hoped that, if conditions are as stated, a solution will be found before it is too late.

SESSIONAL PAPER No. 40

The run of sockeye to Rivers Inlet and Smith's Inlet was beyond all expectations and both fishermen and operators were more than satisfied with the results. It is also reported that the spawning beds of this area were seeded to capacity. As you are aware, no fishing of any kind was allowed in Quashela creek or Wyclese lakes—consequently after the salmon entered Quashela creek they had free access to their spawning grounds.

Conditions in District No. 3, from a canning standpoint, were very unsatisfactory. With the exception of two canneries located in the vicinity of Victoria and one at Alert bay, all canneries in this district have to rely practically on fall fish—and as a consequence the pack is 179,196 cases less than in 1919. There were eleven canneries in this district which could not operate owing to market conditions for fall salmon. This effect was most noticeable on the west coast of Vancouver island, where large catches of chums obtained in 1919, the fishing of 1920 being negligible. The limited operations were due entirely to market conditions and not to a scarcity of salmon, as on the whole there was a splendid run of all salmon indigenous to the waters of District No. 3.

The removal of obstructions from salmon streams has been carried on energetically throughout the whole summer by Engineer McHugh and his assistant, Mr. Hunt.

This work is most necessary and of great value. All the streams in the Owekayno Lake district were cleaned out, the Atnarko river at Bella Coola was greatly improved at a heavy expenditure; a number of streams in the Quathiaski Cove district were attended to—as well as others on the east coast of Vancouver island, and as a result, the fish now have unobstructed passages to their spawning grounds at all these points.

The past season has been a most important and fruitful one from the standpoint of improving the quality of the pack, especially that of the fall fish—pinks and chums. It must be remembered that during the years of the war, the slogan was “the greatest production in a limited time”—consequently the pack of salmon put up at the end of the season may not have been equal in quality to the production of former years, but this is not a single instance, as all lines of goods manufactured suffered in the same way from greater production.

The salmon industry now realizes that the former high standard of quality of the salmon pack in British Columbia must again be attained, and with this object in view many conferences were held to discuss ways and means. It is felt that rigid inspection, either at the canneries or after the pack has been processed, is necessary to reach the desired end.

Many views were expressed, but whilst there is agreement as to the need for continued inspection, it is an open question as to whether this should be an inspection of the fish at the canneries or after they are in the cans.

It was finally concluded that the inspection of the fish before being processed in the cannery and of the sanitary conditions under which operations are carried on should only be attempted as at present, and that the provisions of the Meat and Canned Foods Act be rigidly enforced by the officers of the department.

This is valuable so far as it goes, but it is felt that it should go further and provide for full inspection of canned goods by Government inspectors, whether the product is intended for home or foreign consumption. Both the home and foreign markets desire goods of the highest quality, and if the markets for fall salmon are to be brought back to their former magnitude, the public must be educated up to the fact that in purchasing a can of any species of salmon packed in British Columbia, it can be relied upon, and they are purchasing the best that can be produced in any country.

It is pleasing to refer to the visit of the Hon. C. C. Ballantyne, Minister of Marine and Fisheries, to the coast. Such a visit gave the opportunity for obtaining

12 GEORGE V, A. 1922

first-hand knowledge on fishing conditions as they exist in this province. It brought him in touch with all phases of the industry, as he met canners, fishermen and Government officials, and it is felt his visit will be of great value, both in administration and development.

Those interested in the fisheries of the province were also fortunate in having a visit by the Assistant Deputy of Fisheries, Mr. W. A. Found, who made a thorough inspection of all the fishing grounds covered from the boundary line in the south to the boundary line in Portland canal, as well as the west coast of Vancouver island. Meetings with canners and fishermen were held at several points, and many questions tending to the betterment of the industry were discussed and considered.

There is one question which has been the subject of regret extending from the Atlantic to the Pacific, and which is that there is no separate Department of Fisheries administered by an officer having the full authority of a deputy minister. This matter has been urged on the Government for years as a means by which this great national asset would be open to still greater development and improved administration. The additional cost would be nominal, as the Fisheries Branch has the equipment and officials necessary for a department, the only missing link being the deputy minister.

Coming to the question of fish culture, there has perhaps been, at no time in the history of the fisheries, such an interest taken in this work by the industry generally and the public at large, as at the present time. Columns have appeared in the press giving views and ideas as to how this branch of the service could be improved. Comparisons of the system in vogue in British Columbia as compared with the system in certain states of the Union have been made, and yet it has not been possible to bring forward any definite proof that the Canadian system does not give just as good results as the systems of other countries. It is the desire of the department and its officials to experiment in any direction which may tend to increase the results.

The present system has given splendid results. This is borne out by the fact that in whatever locality artificial fish culture is conducted, the run of salmon is normal—notwithstanding the increased fishing operations.

Public opinion is in the direction of retaining ponds in which fry can be held, especially sockeye, until they are one year old, when they will be liberated to follow nature's course.

Arrangements have been made to increase this system in connection with the Canadian hatcheries, and the season of 1921 will see retaining ponds at all the hatcheries in British Columbia, where the necessary facilities exist for constructing the same.

The success met with at the Oregon hatchery, located at Bonneville, has been referred to on many occasions, and there is no doubt that splendid work has been accomplished. It must be pointed out, however, that the locations of the British Columbia hatcheries do not offer the same facilities as Bonneville. In British Columbia we are subjected to tremendous freshets, which carry everything before them. The Bonneville hatchery is located on the railway, which provides adequate facilities for the transporting of food supplies. There is a steady supply of good water, which is not subjected to freshets at any season of the year.

The hatcheries in this province are located as close to the natural spawning grounds as possible and are consequently isolated and far removed from railway connection, and, in several instances, long distances from the steamboat routes—consequently the question of food for the young fish is a vital one and will require careful consideration and heavy expenditure.

In any event, every effort is being put forward in the desired direction, and every official connected with fish culture is taking up the question with the one desire of successful results.

SESSIONAL PAPER No. 40

Mr. J. A. Rodd, the Superintendent of Fish Culture, made an inspection of all the hatcheries during the month of June, and went thoroughly into all the different methods attempted at the various hatcheries—such as the hatching of eggs in gravel, retaining ponds, and etc. He made suggestions at various places which no doubt will tend to improve conditions.

This officer also represented the department at the Canadian Fisheries Convention held in Vancouver. At this convention there were representatives of the whole Canadian fisheries, as well as visitors from the United States, who submitted papers on certain conditions of the fishing industry and the artificial incubation of fish life.

The convention was a wonderful success, and whilst good work was done by President A. H. Brittain and by every member of the association, it is pleasing to note that at the expiration of Mr. Brittain's term of office he was succeeded by a British Columbian in the person of Mr. A. L. Hager.

In closing, I may say that this will be the last report submitted by me as Chief Inspector of Fisheries for the province of British Columbia, as my retirement from the service dates from the 31st instant.

To the officers engaged in the administration of the fisheries and fish culture in the province of British Columbia I wish to convey my highest appreciation of the loyalty and valuable services they have given, and I feel assured that the same efficiency will be extended to my successor in office.

12 GEORGE V, A. 1922

APPENDIX II

List of United States Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Acushla.....	70	25	12
Adeline.....	50	19	4
Agnes.....	65	18	4
Albata.....	20	7	1
Albert D. Willard.....	23	8	5
Alice M. Doughty.....	15	8	10
Angeline C. Nunan.....	58	13	4
Angie B. Watson.....	36	18	2
Arthur James.....	95	19	1
Athlete.....	96	25	5
Athena.....	56	17	1
Avalon.....	69	21	11
Bay State.....	81	25	11
Benjamin A. Smith.....	95	23	10
Benjamin W. Wallace.....	49	19	1
Catharine.....	103	22	6
Catharine Burke.....	68	19	13
Cavalier.....	96	20	5
C. E. Hopkins.....	44	16	1
Chelwina.....	16	6	1
Constellation.....	89	19	7
Corinthian.....	97	25	10
Cora Wells.....	13	5	1
Curlew.....	209	27	3
Dawn.....	79	21	4
Edith Silviera.....	47	16	3
Eleanor.....	36	9	5
Elizabeth A.....	12	9	10
Elizabeth N.....	102	23	4
Elizabeth and Ruth.....	38	17	10
Elizabeth W. Nunan.....	48	17	1
Eliza L. Spurling.....	49	19	1
Elk.....	66	23	3
Ellen and Mary.....	97	23	1
Ellen T. Marshall.....	75	23	8
Elmer E. Gray.....	71	20	7
Esperanto.....	91	22	5
Ethel B. Ferry.....	56	15	1
Etta Mildred.....	45	16	1
Fannie Belle Atwood.....	81	16	2
Fannie E. Prescott.....	74	20	5
Flora L. Oliver.....	59	19	8
Flora.....	72	19	1
Frances S. Grueby.....	94	25	5
Funchal.....	20	8	6
Genesta.....	53	20	5
Gleanor.....	23	7	8
Good Luck.....	55	19	14
Grebe.....	203	28	1
Harmony.....	66	19	13
Harvard.....	72	19	3
Hazel R. Hines.....	79	21	9
Helena.....	40	17	1
Helja Silver.....	77	21	1
Henry L. Marshall.....	42	16	2
Herbert Parker.....	78	23	7
Heroine.....	149	21	2
Heron.....	208	26	1
Hesperus.....	79	25	12
H. Horton.....	34	12	1

SESSIONAL PAPER No. 40

List of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Higeo.....	12	7	1
Hortense.....	43	18	2
Imperator.....	79	25	9
Ingomar.....	85	23	3
James R. Clark.....	36	18	3
Jeanette.....	51	18	7
John A. Casey.....	14	7	1
John A. Cooney.....	36	9	7
John J. Fallon.....	60	19	3
Joseph Warren.....	11	7	13
John D.....	12	6	9
Josephine D. Costa.....	84	22	2
Joffre.....	80	25	11
Judique.....	89	7	1
Julietta.....	26	4	4
Killarney.....	73	23	12
Kineo.....	71	19	3
Lafayette.....	12	17	6
Laverna.....	95	22	1
Leonora Silveria.....	51	19	10
Louisa R. Silva.....	92	22	8
Lucia.....	43	17	4
Margaret.....	72	19	4
Mary de Costa.....	62	17	4
Mary E. Harty.....	77	18	5
Mary F. Fallon.....	46	15	2
Mary F. Curtis.....	65	19	6
Marshall Foch.....	64	23	9
Mary V. Goulart.....	66	25	2
Margaret and Ruth.....	77	20	1
Malte.....	17	9	1
Malicia Enos.....	8	5	10
Mildred Robertson.....	73	19	13
Minerva.....	13	6	6
Monarchy.....	83	19	5
Morning Star.....	85	22	7
Morten.....	17	9	1
Motor.....	17	9	5
Natalie Hammond.....	57	21	2
Nickerson.....	23	8	7
Nirvana.....	50	12	9
Nyoda.....	28	12	1
Osprey.....	169	27	1
Phillip P. Manta.....	43	18	3
Pioneer.....	128	22	1
Plover.....	208	27	1
Pollyanna.....	66	19	5
Ralph Brown.....	75	23	1
Reliance.....	22	7	4
Republic.....	48	19	10
Rex.....	75	23	11
Richard J. Nunan.....	55	17	10
Rita A. Viator.....	22	9	9
Romance.....	96	24	3
Ruth.....	49	17	9
Russel.....	66	22	1
Ruth and Margaret.....	77	23	8
Ryena.....	6	6	2
Sadie M. Nunnan.....	36	9	8
Sheldrake.....	208	28	1
Stillette.....	91	19	2
Squanto.....	81	17	10
Sunapee.....	18	9	4
Teazer.....	59	19	10
Teal.....	209	27	1
Thelma.....	52	12	2
T. M. Nicholson.....	90	11	5
Togo.....	14	6	1

12 GEORGE V, A. 1922

LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Concluded.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Victor	75	19	4
Viking.....	34	18	5
Vida McKeown.....	83	20	4
Waltham	44	17	3
Waldo L. Stream.....	81	21	7
Walrus	246	26	1
W. H. Reid.....	9	6	8
Widgeon.....	205	28	2
Wild Goose.....	209	28	1

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
A. & R.....	5	2	1
Ace.....	4	1	1
Acushla	10	3	1
Adele.....	5	2	1
Adeline.....	16	3	21
Agnes.....	17	5	3
Alaska.....	55	15	11
Albatross.....	40	13	35
Alf.....	9	2	2
Alfa	12	5	11
Alton	43	15	13
Altree.....	43	15	2
Alice B	13	5	5
A. M. Nixon.....	29	11	1
America.....	25	11	18
Angelus.....	4	3	1
Anise	3	2	3
Anna	5	4	1
Anna J.....	22	5	4
Annie ..	11	4	2
Apex I.....	15	4	1
Arctic.....	29	4	12
Arcadia.....	14	4	9
Arrow	4	2	1
Atica	12	3	2
Atlas	31	11	9
Atlantic.....	25	11	6
Augusta.....	19	5	5
Aurora	13	5	9
Baltic	20	5	3
Barnot	3	2	1
Bartalome.....	4	3	12
Bear.....	4	2	1
Beaver	9	4	14
Behring Sea.....	44	5	1
Bell	4	2	2
Betty	4	3	1
Bill R.....	39	6	1
Blue Sea.....	12	23	1
Blue Bird.....	4	1	3
Bravo	4	2	16
Bring Gold.....	12	5	10
rothers ..	13	5	8

SESSIONAL PAPER No. 40

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast
during the Year ended December 31, 1920—*Continued*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Bruce....	2	2	1
Buddy.....	34	5	1
Ceaser.....	8	2	1
Carmen.....	28	7	2
Cape Spencer....	11	4	10
Cape Clear.....	13	4	1
California.....	20	3	1
Castle.....	4	2	5
Carolyn.....	18	5	10
Castor.....	6	3	2
Cedric.....	7	2	1
Celt.....	29	6	1
Charlotte.....	4	2	1
Chancellor.....	13	5	11
Chimawa....	2	2	1
Chimera.....	9	3	2
Christina.....	4	2	3
Clanex.....	12	4	1
Clara....	10	2	9
Commonwealth.....	60	18	1
Commander.....	22	3	1
Companion.....	5	4	1
Confidence.....	22	4	2
Constitution.....	39	15	9
Convention.....	20	5	19
Cora.....	4	2	9
Corona.....	19	11	7
Crescent.....	14	5	11
Dague.....	4	1	1
Daily.....	25	5	12
Daisy.....	18	8	11
Deceiver.....	17	5	1
Defence.....	20	5	6
Democrat.....	27	6	8
Diamond T.....	8	2	6
Dick.....	10	5	4
Dime.....	6	1	1
Director.....	12	4	10
Doll.....	4	1	1
Dolly Dimple.....	4	3	1
Duce.....	6	1	1
Eagle.....	27	5	18
Eastern Point.....	4	3	16
Eidsvold.....	15	5	19
Einer Beyer.....	92	7	2
Elco.....	5	2	3
Eleanor.....	16	5	3
Elfia.....	5	2	1
Ellen.....	4	3	1
Ellen W.....	6	1	1
Elma.....	4	2	2
Elmira.....	4	2	1
Eloaese.....	8	2	2
E. L. Ray.....	7	3	1
Elsie.....	14	4	7
Elsinore.....	23	3	1
Emily.....	4	2	1
Emblem.....	4	3	1
Enrich.....	5	2	1
E. Neilson.....	15	5	5
Ethelyn.....	4	2	2
Eureka.....	5	2	1
Evening Sun.....	3	1	2
Evolution.....	17	5	15
Fairway.....	19	5	10
F. C. Hergert.....	15	6	8
Fighting Bud.....	4	2	1
Fisher.....	14	5	25
Flamingo.....	13	5	13

12 GEORGE V, A. 1922

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast
during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men. in Crew.	Number of Times Entered.
Flattery	10	4	5
Fordenskjola	39	13	3
Fortescu	21	5	1
Fortuna	21	5	11
Forward	18	5	2
Foss No. 6	12	1	1
Fram	4	3	5
Frances M	4	2	2
Frances R	9	3	1
Genfurco	5	2	1
Gjoa	13	4	2
Glacier	12	4	12
Goney	12	5	10
Grant	5	2	2
Grayling	16	5	16
Gypsy	4	1	2
H. & R.	4	3	23
H. B. Jones	23	7	2
Happy	12	4	2
Harder	8	3	2
Harvester	15	5	7
Hattie B.	6	2	1
Hazel	7	4	1
Hazel H.	25	5	5
Hecla	6	2	3
Helen	3	2	1
Helena	15	5	14
Helen D.	8	3	6
Helegeland	56	15	9
Hesperus	5	4	1
Hilda	10	3	9
Hi Gill	4	3	1
Holdal	4	3	8
Home	9	3	1
Honey Boy	6	1	1
Hope	3	1	8
Hulda	6	3	2
Hutch	4	1	1
Ictus	5	2	1
Idaho	6	2	1
Imperial	23	5	8
Inger	7	2	1
Iris	2	1	1
It	5	1	1
J. A. G.	8	2	1
Jean	9	4	4
Jennie	16	2	5
Jennie F. Decker	16	8	17
Joker	5	2	3
Johanna	15	5	13
J. P. Todd, I.	4	2	4
J. P. Todd, II.	12	4	3
Jugo Slav	33	3	1
June	9	4	4
Kasann	28	5	1
King and Wing	97	23	11
Kodiak	38	13	14
Kyak	8	3	12
K. 18	4	1	1
K. 225	3	2	3
K. 227	5	1	2
K. 619	4	2	1
Lansing	16	4	13
Lapaloma	44	11	6
Laura	7	2	4
Lawrence P.	13	10	1
Lebanon	14	5	11
Leif	21	4	2
Lenore	14	4	3

SESSIONAL PAPER No. 40

List of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Leo.....	6	3	1
Leonine.....	24	4	1
Leonora.....	3	2	2
Liberty.....	44	15	25
Lilly.....	3	1	2
Lincoln.....	28	5	12
Little Jack.....	40	5	1
Livingstone.....	24	6	8
Louise.....	16	5	10
Lovera.....	4	2	6
Lubra.....	13	5	1
Lumen.....	10	4	12
286. L.....	5	1	1
Mabel A.....	22	5	8
Mabel C.....	4	2	1
Mackeral.....	8	3	10
Madeline J.....	21	5	8
Maghuel.....	6	3	1
Margaret F.....	10	4	4
Mars.....	9	4	9
Martha.....	7	4	1
Margaret.....	37	4	1
Mary.....	16	8	3
Mary B.....	22	5	1
Mary N.....	4	1	1
May.....	4	2	3
Memories.....	8	2	1
Mermaid.....	19	5	12
Mildred.....	19	8	12
Mira.....	4	3	7
Mobile.....	4	1	1
Mololo.....	9	11	18
Morengen.....	17	5	2
Myrtle.....	9	5	18
Narada.....	42	6	3
National.....	20	5	8
Nellie C.....	5	2	1
Neptune.....	3	2	1
New England.....	70	28	4
Niagara.....	13	3	3
Nidaross.....	13	5	25
Nip.....	4	2	2
Nomad.....	15	5	12
Norland.....	19	5	6
Nordby.....	9	5	1
Norma.....	6	3	14
North.....	9	3	14
North Cape.....	4	3	1
North Sea.....	5	1	2
Northland.....	4	2	4
Nule.....	6	2	1
Ocean Wave.....	10	6	1
O. K.....	7	2	1
Olympic.....	30	11	7
Omaney.....	34	13	8
Onah.....	18	5	14
Orient.....	48	15	12
Osborne.....	10	2	2
Pacific.....	16	11	13
Pagebie.....	10	2	1
Panama.....	34	13	13
Papoose.....	3	2	1
Pauline.....	14	5	11
Pershing.....	18	15	11
Peerless.....	24	1	1
Pioneer.....	48	15	9
Pioneer III.....	26	5	7
Pirate.....	20	14	1
Polaris.....	45	15	9

12 GEORGE V, A. 1922

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast
during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Pollyanna ...	6	2	1
Fresho ...	17	5	7
President	24	6	4
Primrose ...	4	2	1
Primrose	3	1	1
Progress.....	5	3	8
Prospector.....	50	7	3
Puffin.....	18	6	1
Quadra	29	6	1
Rainer.....	4	4	7
Reform.....	4	4	1
Reliance ..	14	4	17
Reliance I .	19	5	22
Republic.....	51	15	10
Restitution.....	24	5	16
Retriever.....	7	3	2
Roald.....	12	2	1
Roald Amunsden.....	15	5	7
Roamer II ...	4	2	1
Rolfe ...	10	4	2
Romane	8	2	1
Roosevelt.....	13	5	10
Rosario.....	16	5	11
Royal	15	5	5
Ruth.....	10	3	1
Ryal ...	4	2	1
S. & S.....	4	2	2
Sadie	4	2	2
Sadie K.....	13	5	2
Salmora	20	5	3
Saltern.....	4	2	4
Sammy.....	8	3	1
Samson...	7	2	11
Sands ...	4	2	1
Santa Rita.....	15	2	1
Scandia....	79	17	9
Scout.....	5	2	2
Seahome ...	3	3	1
Sealion....	6	2	3
Seattle....	55	15	11
Searchlight.....	7	5	1
Senator.....	11	11	8
Sentinel	21	6	4
Seymour	44	15	7
Shamrock.....	21	3	12
Sherman.....	18	5	7
Signal.....	13	12	2
Siloam.....	16	5	13
Sitka...	50	16	12
Sokol	7	2	3
Sophia Johnstor	46	5	1
Speculator.....	9	4	15
Spencer.....	17	5	10
Star	12	4	8
Starlight	35	5	1
Starling.....	14	6	1
Success.....	4	3	2
Sumner	34	15	8
Sunland.....	26	11	1
Sun Wing ...	15	5	8
Superior.....	16	5	9
Swiftsure	22	5	12
Tahoma.....	18	11	11
Tarar.....	4	1	1
Tatoosh ...	24	6	12
Teddy J.	13	5	7
Texas ...	16	5	20
Thelma.....	3	2	2

SESSIONAL PAPER No. 40

List of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Concluded*.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Thelma II	26	5	7
Thelma M.....	7	2	1
Thor	4	2	2
Tillicum	21	5	12
Tip Top.....	9	2	2
Tom and A II.....	57	15	11
Topsy	6	2	2
Tordenskjold	39	13	8
Trio	19	5	1
Trip.....	19	5	1
Tyee.....	89	20	10
Tzartoos.....	22	6	2
T. 810.....	5	1	1
T. 840.....	4	2	1
T. 865.....	3	4	1
T. 981.....	5	1	3
Uncle Salmon.....	32	4	13
Unimak	10	3	1
Uranus.....	15	5	11
Valden	10	10	1
Valid	8	3	13
Vamoose.....	16	3	1
Vansee.....	43	15	5
Ventura.....	5	2	4
Venus	25	8	14
Verbus Units.....	10	5	1
Verdun.....	8	2	1
Vesta.....	13	4	18
Victor	8	3	2
Victory.....	5	1	1
Viga.....	17	5	1
Viking.....	8	3	17
Vinland	4	2	4
Vivian	5	2	4
Volunteer.....	19	6	5
Washington.....	24	11	2
Wave.....	7	3	2
Westfjord.....	17	5	13
Whitestar	17	4	5
Whitman.....	26	5	1
Wildwood.....	13	2	7
Wilhelmira.....	17	5	10
Wilson	19	5	13
Wireless.....	17	5	15
Woodrow.....	23	5	1
W. 6	26	4	1
Yakutat	41	13	16
Yellowstone.....	22	6	10
Yes Bay.....	75	8	2
Yule	6	2	1
Zilla May	55	15	15

APPENDIX-III

REPORT OF FISHERIES ENGINEER CHARLES BRUCE ON FISHWAYS
IN THE MARITIME PROVINCES, 1920

I beg to submit the following report on the condition of fishways in the various dams on rivers in the Maritime Provinces.

NOVA SCOTIA

Yarmouth County.—A fishway constructed by the town of Yarmouth in a small dam at the head of Yarmouth harbour, was completed during the summer, and is reported by the Overseer to be in an excellent and effective condition.

The changes to be made in the fishway in the Carleton power dam were not done this year as the alterations to the power plant were not completed.

Shelburne County.—A fishway was constructed by the Clyde Pulp Company in a low dam built during the summer on the Clyde river.

Queens County.—The fishways in the three lower dams on the Mersey river were repaired and a new one built in the fourth dam by the department. A new fishway was built in the fifth dam by the town of Liverpool. Enquiries to secure evidence that salmon were taken on the rod above these dams shortly after completion of the fishways as was reported, have up to this date not been replied to. It is probable that definite information will not now be available until next spring's run of fish enters the river.

The fishway built during the fall of 1919, in the Pulpmill dam on the Medway river, proved quite successful, large numbers of both salmon and alewives being taken above the dam during the past summer. This fishway, which was constructed of concrete, suffered some damage due to the fact that water was allowed to pass through it before the concrete was thoroughly hard. Repairs were made by the Pulp Company.

Lunenburg County.—Inspections were carried out on both the Lahave and Mush-a-mush rivers.

In the former the fishway in the second dam, owned by the Davidson Lumber Company, was considerably damaged by freshets during the spring. The company was making repairs to the dam and providing for complete repairs to this fishway.

The inspection of the Mush-a-mush showed that eleven dams exist all but three of which were equipped with fishways. The owners were served with notices to build fishways in these, but owing to a shortage of cement the work was not brought to completion this fall. On three of the existing fishways certain repairs were ordered in order to make them more efficient.

Halifax County.—As the fishway in the dam on the Musquodoboit river had become inefficient, due to the leaky condition of the dam itself, a portion forty feet long was removed from the dam to allow the free ascent of fish.

Guysboro County.—A fishway was built by the owners in a dam on the Salmon river, and is reported to be in good and efficient condition.

An opening has been made in the Isaac Fisher dam on the Antigonish branch of the St. Mary's river to admit the ascent of fish.

Colchester County.—A new fishway was built by the owners in their dam on the Economy river, which is reported to be in good and efficient condition.

An opening was made in a small dam on the Bass river owned by the Dominion Chair Company, to admit the free passage of fish.

SESSIONAL PAPER No. 40

Cumberland County.—A new fishway was built by the owners in their dam on the east branch of the Apple river. This is reported to be in good and efficient condition, and the overseer states salmon have been seen some distance above the dam.

King's County.—A fishway was completed by the owners in their dam on the Gaspereaux river. This dam is thirty feet high, and the phenomenal success of the fishway for the ascent of alewives, literally thousands having passed through it, is considered as deserving of note. Previous to the construction of this fishway the highest dam, in which a successful fishway was in operation, was one in a dam on the Kouchibouguac river in New Brunswick, having a height of twenty feet. Owing to changes being made at the power plant during the summer and fall, as well as an extremely dry season, the water was very low, so that it is doubtful if any salmon succeeded in ascending the fishway. There does not appear any reason, from a structural viewpoint, why they could not do so, and it is hoped after the company completes the power construction so that final conditions can be determined that a rearrangement of the lower entrance of the fishway may remedy conditions.

Annapolis County.—The fishway in the dam on the east branch of the Bear river was rebuilt by the owners during the summer, the old structure having been in a poor state of repair. The new structure is reported to be in a good and effective condition. The fishway in the dam on the Lequille river, owned by the town of Annapolis, was repaired during the summer. These repairs were not carried out strictly in accordance with the department's instructions, but during an interview with the commissioner of lights for the town, he gave evidence that trout had been seen in the fishway at several points on its course. One of the chief difficulties to contend with on this river is that the flowage is so small during the greater part of the season that the electric power, in order to operate at all, drains the water below the upper entrance of the fishway. The town is building a storage dam further up the river to prevent this condition, and it is hoped this will tend to materially improve matters so far as the operation of the fishway is concerned.

A fishway was completed during the summer of 1919 in the dam on the Annapolis river at Lawrencetown. The department was confronted with a serious problem at this dam, in that the Annapolis is one of the few rivers on the Atlantic coast frequented by shad for spawning purposes, and, so far as it was aware, no successful fishway for the use of this fish was known. The dam is approximately five feet high with water at normal level. When this dam was built plans of a fishway to be constructed of wood were prepared and submitted to the owner. In building the fishway he departed from the plans, with the result that no shad ascended the river during the season of 1919. The matter was again taken up and it was decided, in rebuilding, to avoid wooden construction, and to cater as far as possible to the timid habits of the shad by so constructing the fishway that it would appear as a natural channel. In order to determine a safe grade for the fishway a study was made of the "rips" which occur below the dam, up which it was known shad had passed in large numbers. The fishway was then laid out and built according to the plans attached. The "rips" above referred to showed a grade of approximately one in fifteen, which was adopted as a maximum for the fishway. No partitions other than stone projections to retard the continuous flow somewhat were put in. These projections not only retarded the flow, but formed a deadwater below in which the shad could rest before ascending further. A width of not less than eight feet was maintained throughout, wider portions shown being due to the natural contour of the ground admitting of such without excessive work.

A condition which made construction at this place somewhat difficult was the fact that the material in excavations was entirely of clay and quicksand. Excavations were carried well back and faced with stone walls and the floors paved to prevent erosion. In spite of these precautions, a short time after the water was turned

12 GEORGE V, A. 1922

through it gullied out at the bend where the direction is changed and had to be filled in with heavy stone.

In the spring of 1920 when the shad entered the river a close observation was made at the fishway, and during one hour upwards of fifty were seen to pass through and into the pond above. Later evidence was secured that these fish had reached the spawning grounds. Salmon and trout also ascend this fishway.

NEW BRUNSWICK

Westmorland County.—During the summer of 1919 fishways were built in the Jones dam on the Petitecodiac river, in a dam owned by the Salisbury Lumber Company on the Coverdale river, and in the Jordan Sanitorium dam on the Pollet river, both these latter rivers being tributaries to the Petitecodiac.

In the summer of 1920 a fishway was built in the S. H. White dam on the Pollet river.

All of these fishways are reported to be efficient, so that the situation so far as this system of rivers is concerned is to be considered very satisfactory.

Charlotte County.—An opening was made by the owners in an unused dam on the New river which admits of salmon and other fish ascending to the spawning grounds.

An inspection was carried out at the falls on the Magagnadavic river at St. George, a report on which has already been submitted.

In general it may be said that the efforts of the department along these lines have been marked with a good measure of success. A number of problems will engage attention next year. It is desired to point out that the design of an efficient fishway constitutes an individual problem in each locality. No two dams present similar conditions, and quite frequently the conditions are not favourable owing in some instances to natural conditions and in others to the fact that the owners of dams have built them in such a manner that the placing of a fishway is practically impossible.

APPENDIX No. IV
FISHERIES EXPENDITURE, 1920-21

	Appropriation.	Expenditure.
	\$ cts.	\$ cts.
Salaries and disbursements, Fishery Officers.....	710,000 00	709,449 34
Fisheries Patrol Service.....		
Oyster Culture.....		
Fish breeding.....	365,000 00	364,789 43
Conservation and development of the deep sea fisheries.....	25,000 00	15,622 18
Building fishways and cleaning rivers.....	40,000 00	38,620 29
Legal and incidental expenses.....	4,000 00	455 56
Fisheries Intelligence Bureau.....	5,000 00	1,500 88
Inspection of canned and pickled fish.....	15,000 00	6,165 59
Marine Biological Board.....	26,000 00	26,000 00
Scientific investigations into fisheries.....	15,000 00	4,690 11
International Commission—Fraser River.....	10,000 00	
New patrol boats.....	60,000 00	43,643 79
Expenses Quebec Fisheries Reference.....	21,645 55	21,645 55
	1,296,645 55	1,232,582 72
Fishing Bounty.....	160,000 00	152,519 30
	1,456,645 55	1,385,102 02
Unforseen expenses.....		593 20
Cost of living bonus.....		85,599 61
Miscellaneous—gratuities.....		890 00
Reclassification of salaries.....		36,740 23
Totals.....	1,456,645 55	1,508,925 06

FISHERIES REVENUE, 1920-21

Licenses, Fines and Sales.	Amounts Collected.	Refunds.	Net Amounts.
	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	12,189 62		12,189 62
Prince Edward Island.....	3,720 12		3,720 12
New Brunswick.....	15,170 52		15,170 52
Quebec.....	6,540 15	3 25	6,536 90
Ontario.....	2,053 25		2,053 25
Manitoba.....	11,798 99	5 00	11,793 99
Alberta.....	8,698 75	5 00	8,693 75
Saskatchewan.....	4,082 30	5 00	4,077 30
British Columbia.....	239,102 04	5,820 00	233,282 04
Yukon.....	280 00		280 00
	303,635 74	5,838 25	297,797 49
Casual Revenue.....			7,362 44
Fish Breeding Revenue.....			13,295 89
Revenue under Pelagic Sealing Treaty.....			185,748 07
Premiums on exchange.....			24,560 59
Total.....			528,764 48

SESSIONAL PAPER No. 40

APPENDIX No. V

The following is a statement showing the number of Licenses of the different kinds, issued in EACH PROVINCE during the 1920-21 Season:—

Kind of License—	QUEBEC.	No. Issued.
Lobster Packing.....	71	(2 cancelled).
Lobster Extensions, 19.....	6	
Fish Cannery.....	627	
Lobster Fisherman's.....	155	(2 cancelled and 1 free).
Salmon Fishery.....	41	
Herring Trap-Net.....	272	
Cod Trap-Net.....		
Receipt Books, 242 (1 canc).....		
Rental of Salmon Fishing Privileges in the estuary of St. John River, 1.....		
		1,172 (4 cancelled and 1 free).
	PRINCE EDWARD ISLAND.	
Lobster Packing.....	186	
Lobster Extensions, 120.....	4	
Quahaug.....	14	
Fish Cannery.....	1,880	(6 cancelled).
Lobster Fisherman's.....	224	(1 cancelled).
Oyster Fishery.....	3	
P.E.I. Trap-Net.....	201	
Smelt Gill-Net.....	230	(1 cancelled).
Smelt Bag-Net.....		
		2,742 (8 cancelled).
	NOVA SCOTIA.	
Lobster Packing.....	165	(1 cancelled).
Lobster Extensions, 146.....	353	
N.S. Angling Permits.....	15	
Fish Cannery.....	8,258	(5 cancelled).
Lobster Fisherman's.....	273	
Smelt-Gill Net.....	218	
Smelt Bag-Net.....	150	(1 free).
Oyster Fishery.....	207	(2 cancelled).
N.S. Trap-Net.....		
Trap Net Extensions, 1.....	20	
N.S. Salmon Net.....	177	
N.S. Drag Seine.....	83	
N.S. Herring Weir.....	173	
Scallop Fishery.....	8	
Lobster Pound Licenses.....		
Lobster Pound Certificates, 326.....		
		10,100 (8 cancelled and 1 free)
	NEW BRUNSWICK.	
Lobster Packing.....	184	
Lobster Extensions, 46.....	7	
Fish Cannery.....	2,104	(5 cancelled).
Lobster Fisherman's.....	10	
Scallop Fishery.....	81	
Clam Permits.....	644	
Herring Weir.....	50	
Bass Gill-Net.....	52	
Quahaug Fishery.....	496	
Salmon Fishery.....	103	
Smelt Gill-Net.....	2,337	(25 free).
Smelt Bag-Net.....	345	
Oyster Fishery.....	130	
Oyster Permits.....	54	(5 free).
Bass Fishery.....	3	
Sturgeon Fishery.....	82	
Salmon Net Permits.....	18	
Whitefish Fishery.....	3	
Lobster Pound Licenses.....		
Lobster Pound Certificates, 285.....		
Lease of Dark Harbour, 1.....		
		6,703 (5 cancelled and 30 free).

12 GEORGE V, A. 1922

MANITOBA.

Kind of License—	No. Issued.
Special Fishery.....	2,040 (1 cancelled).
Settler's Permits.....	401
Commercial Sturgeon.....	53
Domestic Sturgeon.....	Nil.
Special Angling for Non-Residents.....	Nil.
Receipt Books.....	1,124

2,494 (1 cancelled).

SASKATCHEWAN.

Fish Cannery.....	1
Sask. Commercial and Fisherman's.....	585 (1 cancelled).
Domestic.....	120 (1 free and 1 cancelled).
Indian and Half Breed Permits.....	632
Angling Permits.....	Nil.
Commercial Sturgeon.....	16
Domestic Sturgeon.....	10 (1 cancelled).
Receipt Books, 742 (5 cane).....	

1,364 (1 free and 3 cancelled).

ALBERTA.

Commercial and Fisherman's.....	699 (4 cancelled).
Domestic Sturgeon.....	Nil.
Domestic Fishery.....	146 (12 cancelled).
Commercial Sturgeon.....	Nil.
Indian and Half Breed Permits.....	272
Angling Permits.....	2,272 (5 cancelled).
Receipt Books, 846 (5 canc.).....	

3,389 (21 cancelled).

BRITISH COLUMBIA.

B.C. Angling Permits.....	62
Fish Cannery.....	21
Indian Permits.....	164
Gill-Net, Drift-Net or Drag Seine licenses operated in conjunction with Power Boats.....	332 (5 cancelled).
Smelt or Sardine Fishery.....	77
Crab Fishery.....	186
Commercial Fishery for Salmon Trolling.....	1,858 (2 cancelled).
Salmon Cannery or Curing Establishment.....	66 (2 cancelled).
Salmon Trap-Net.....	19 (1 cancelled).
Salmon Purse Seine.....	162 (14 cancelled).
Salmon Drag Seine.....	45 (3 cancelled).
Sturgeon Fishery.....	3
Herring or Pilchard, Gill-Net or Drift-Net.....	48
Herring Drag Seine.....	2
Herring Purse Seine.....	41 (3 cancelled).
Salmon Gill-Net or Drift-Net.....	4,765
Reduction Works.....	8
Herring Drag Seine or Purse Seine for Halibut Fishing Vessels.....	Nil.
Boat License to buy fish from fisherman.....	169 (3 cancelled).
License to a person engaged in Cold Storage or fish packing to buy fresh salmon from fishermen.....	110
Whale Factory Licenses.....	3
Abalone Fishery.....	Nil.

8,141 (30 cancelled).

YUKON TERRITORY.

Special Fishery.....	22
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ONTARIO.

Cannery.....	1
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Total number issued.....36,128 (80 cancelled and 33 free).